EXASCEND

www.exascend.com

Product Guide

Industrial, enterprise and automotive storage solutions

Contents

About Exascend

Exascend is a leader in industrial, enterprise and automotive data storage specialized in fully customizable advanced storage solutions developed entirely in-house. Our passion is to develop flash storage solutions that deliver enterprise-grade performance and industrial-grade stability to the world's most demanding storage applications.

Recognizing the benefit that in-house development brings to our customers, we engineer our products from the ground up – from hardware to software – and manufacture them in-house to ensure only the highest quality. Since our founding in 2006, we have accumulated over 60 U.S. and global patents on flash storage technology, firmly establishing Exascend as a leading innovator in the storage industry.

For over a decade, our storage solutions have been qualified and deployed by Fortune 500 companies, top defense contractors and government agencies around the world. Our unique commitment to 100% in-house development of hardware and firmware, our leading validation suite, ISO 9001- and IATF 16949-certified manufacturing and quality management processes makes us the ideal partner for leaders no matter their location or industry.

Our unwavering commitment to deliver the best-engineered, most reliable and truly innovative solutions allows us to push the boundaries of what is possible for our products and our customers' applications.

Inspiration to Innovation.

A partner that delivers

At Exascend, we are all about making our customers and their applications excel at what they do. By leveraging our best-in-class products combined with our unique customization services, we provide a superior experience that guarantees the best results. We measure our success in how successful we make our customers. That is our commitment.

Raise your profit margin

Deliver perfectly engineered and truly differentiated products and services by leveraging Exascend's fully optimized storage products – enabling you to put yourself ahead of the competition and avoid competing on price.

Accelerate your time to market

Exascend is the industry's only one-stop solution provider – with design, validation and manufacturing all done in-house – reducing the time and complexity of bringing even the most thoroughly customized products to life.

Focus on what you do best

Let us take care of your storage challenges for you, helping you save resources and mitigate the risk of uncertainty and delays.

Stop worrying about reliability

Rest assured that your storage devices are at no risk of unexpected failure with Exascend's unwavering commitment to product quality and industry-best reliability. Our products are designed, validated and manufactured according to the highest standards, including 10,000 sudden power-loss testing cycles and fully dynamic -45–90 °C wide temperature chamber testing.

Commodity SSD

International module houses

- "Me too" products based on third-party turnkey solutions offering inadequate customization, in-depth engineering know-how and support.
- Late to market with little or no differentiation dependent on competing on price to gain market share in existing markets.
- Little or no control over product quality, reliability, technical support or after-sales service.

V.S.

Value-added SSD

Exascend

- Differentiated product with unique features, optimized for customer's operation profile, carving out uncontested market space where the customer does not need to compete on price.
- Quick turnaround time allowing the customer to seize windows of opportunity in the market, thus being able to seize market share and charge a premium on its products.
- High-quality products with unparalleled reliability, support directly from the engineering team and outstanding after-sales service.

Customization

Engineering Imagination to Innovation

Hardware

Capacity and form factor
Interface and connector
ESD protection
Conformal coating
Hardware erase and erase protocol
Temperature sensor and thermal management
LED configuration and polarity
Power and performance modes
Hardware power loss protection
Flash and DRAM capacity (ODM)
Auxiliary function

Firmware

Firmware power loss protection
RAID ECC data protection
Encryption (SED/TCG)
Data erasure protocols
Full-drive pSLC
SLC cache mode
Custom flash support (ODM)
Sequential and random performance tuning
QoS and latency tuning
Write amplification (WAF) tuning
Wide temperature flash tuning
Power management tuning
Thermal and power throttling

Configuration and testing

Endurance target
ESD, shock and vibration testing
System compatibility and interoperability
Unlimited over-provisioning
Power consumption measurement
Power loss testing
Specific workload regression
Wide temperature testing
MP testing flow (ODM)
Optional leaded process
Write protect/read-only mode

Core competency

Enterprise performance, industrial ruggedness – engineered by Exascend.

In a world of ever-accelerating data generation, Exascend empowers organizations and individuals in capturing, preserving, accessing and transforming data.

Focused and exclusive

Exascend is the only industrial, enterprise and automotive flash storage manufacturer among its peers with engineering expertise to fully utilize premium SATA & NVMe controllers from tier-1 manufacturers. We distinguish ourselves from the competition with our full range of top-tier SSDs, memory cards and managed NAND featuring our in-house hardware and firmware designs, extreme customizability and perfect blend of enterprise performance and industrial ruggedness.

Exascend customization

We offer our SSDs with tier-1 controllers in standard form factors and entirely custom designs. In standard form factors, we offer capacities ranging from 120GB all the way up to 30.72TB. With custom designs, we go as high as 32TB on a single SSD. We provide tailored hardware, firmware, performance, latency and QoS tuning, power and thermal throttling and much more – making our customization services second to none in the flash storage industry.

In-house design, validation and testing

We take pride in holding our design and total solution validation and testing to the highest standards. With our ISO 9001:2015 and IATF 16949-certified manufacturing and quality management system and our over 10 years of experience delivering products to Fortune 500 companies and leading global OEMs, we are fully dedicated to ushering in a new – and much higher – quality standard for our industry. In addition to using well-known commercially available testing programs, Exascend also develops its own testing platform to continuously improve product stability, reliability and quality.

Product quality assurance and consistency

Exascend guarantees fixed BOM for key components such as NAND flash, controller and firmware. All our SSDs are fully tested at the mass production stage for being delivered to customers. Moreover, our exclusive quality management system guarantees 100 percent transparency and traceability for all our products.

Failure analysis and one-stop resolution service

With our full control over hardware and firmware in our solutions, we are uniquely positioned to provide customers with swift resolutions to any issues. In the event of an issue, we provide failure analysis, root cause report as well as fully resolving the issue encountered by our customer. Upon request, we can also provide an 8D report.

Factory data recovery

An SSD's most valuable asset is not the device itself but rather the data stored within. Exascend is fully committed to safeguarding customers' data with unequaled product quality, stringent testing and advanced data security technologies such as RAID ECC. In the unlikely event that a customer's Exascend device experiences issues, whether due to a defect or an accident, we offer exclusive on-site resolution and factory data recovery service to ensure that the customer's data has the highest chances of full recovery. Our unique control over both hardware and firmware puts us in the perfect position to carry out deep-level data recovery unlike any of our peers in the industry. Our customers' data is our number-one priority. Always.

Corporate profile

Company overview

Founded | 2006
Established as Exascend | 2016
R&D center | Shanghai, China
Service centers | Shanghai, Shenzhen, Taipei, Sunnyvale (CA, USA) and Eindhoven (Netherlands)
Manufacturing | Available in Taiwan and China

Our vision and mission

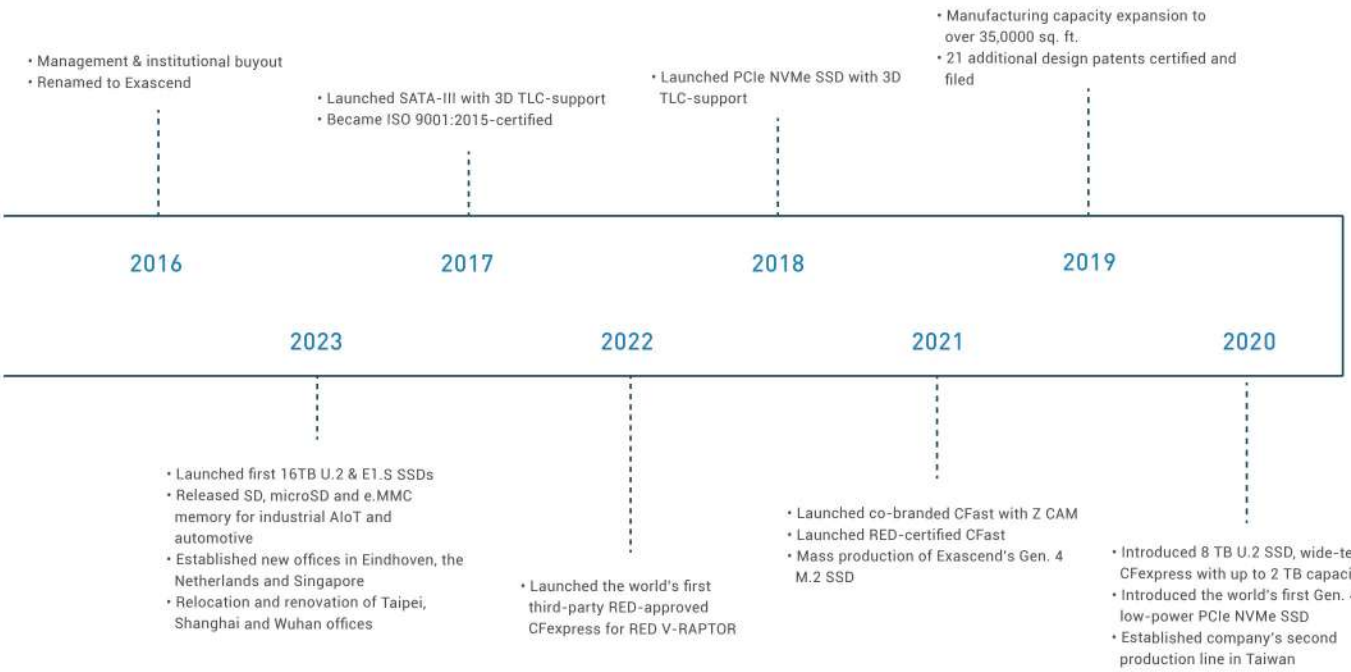
Vision

To be the most respected provider of reliable customized storage solutions across the industrial and enterprise markets.

Mission

To provide innovative tailored storage technology solutions that empower users to push the boundaries of what is possible.

Recent company highlights



Technology highlights

We are deeply passionate about flash storage and the technologies that power the future of computing. Each day, we bring that passion into action by being an early adopter of the latest form factors, interfaces and standards that push our industry forward. Whether you require performance, security, durability, integrity or reliability – we offer uniquely capable technologies for giving your applications a real storage upgrade.

Performance

SuperCruise™ Exclusive technology

Developed by Exascend and exclusively available for Exascend's flash storage devices, SuperCruise™ is an extremely sophisticated firmware technology that optimizes write performance for stability over time. The SuperCruise™ algorithm monitors the flash storage device's ratio of free block production and consumption and adjusts read/write behavior in order to achieve consistent performance that does not fluctuate over time.

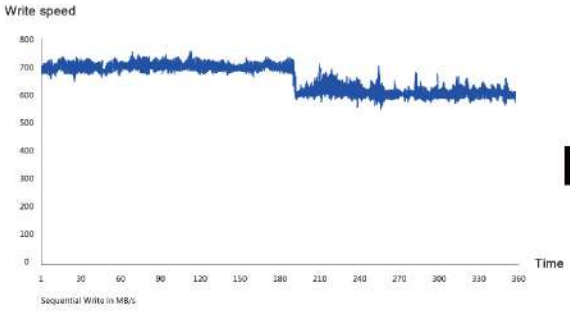


Figure 1: Typical SSD performance over time (sequential/random mixture)

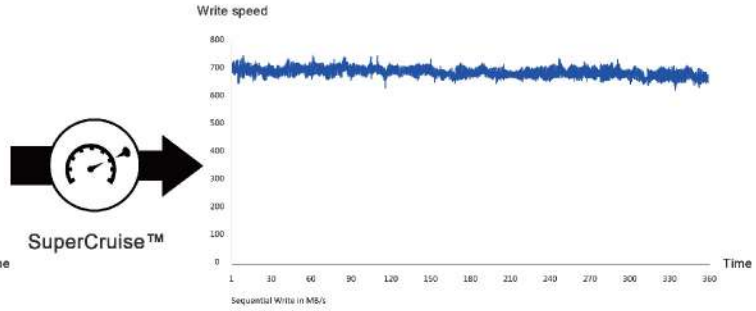


Figure 2: Exascend SSD with SuperCruise™ performance over time

Power Tuning

Our unique level of control over hardware, firmware and manufacturing enables us to provide unmatched tuning services. By tuning the performance of our product specifically for your applications, we can achieve the highest possible performance-to-thermal and performance-to-power ratios.

Extreme Capacity

Our extreme-capacity flash storage solutions leverage the best high-capacity NAND flash in the industry and blazing-fast controllers. The firmware we write ourselves, guaranteeing support for capacity configurations like no other – even in small form factors.

Pseudo SLC (pSLC)

Pseudo SLC technology, available in Exascend flash storage devices, bridges the gap between these two NAND flash types. It combines the cutting-edge advantages of 3D TLC NAND with the blazing-fast performance and endurance associated with SLC NAND. As a result, pSLC offers enhanced durability, higher performance, and balanced cost-effectiveness.

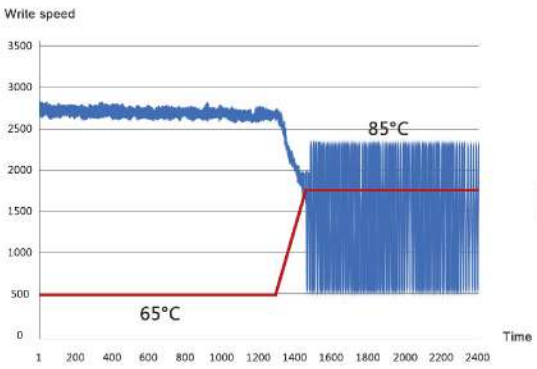
Afterburner™

Afterburner™ is a performance-enhancing Exascend technology that leverages SLC cache to boost sequential read and write speeds in storage devices with 3D TLC NAND.

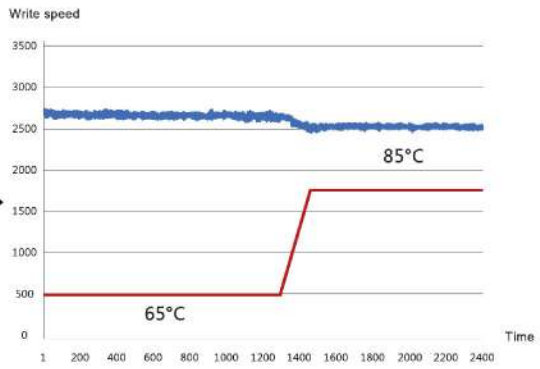
Adaptive Thermal Control™

Exclusive technology

Exascend's proprietary Adaptive Thermal Control™ technology tackles the issue of overheating and thermal throttling that is unavoidable in high-performance PCIe NVMe flash storage devices. Typically, flash storage devices maintain thermals under a set threshold by throttling performance – causing massive drops and spikes in performance as the devices try to keep up with changes in temperature. Exascend's Adaptive Thermal Control™ technology mitigates this issue by intelligently finding the perfect equilibrium point between performance and device thermals where a consistently high level of performance holds steady over time – avoiding the constant performance bursts and drops endemic with high-speed NVMe devices.



SSD write burn-in performance going from 65 °C to 85 °C with typical thermal throttling



SSD write burn-in performance going from 65 °C to 85 °C with Exascend's Adaptive Thermal Control™

Security

Custom Data Sanitization

Rapid purging of sensitive data is a critical feature in mission-critical applications. Exascend's storage devices offer customizable secure data sanitization, including normal erasure as well as software and hardware-triggered data erasure fully compliant with federal agencies' data sanitization protocols – ensuring rapid-fast and fully secure data erasure.

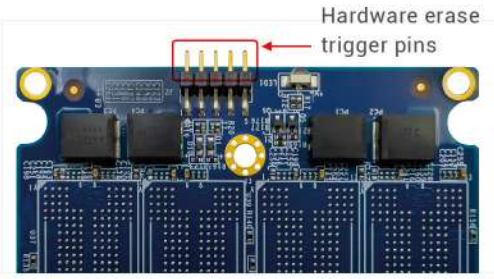
Firmware-supported modes

- NSA 9-12
- NSA 130-2
- AFSSI 5020
- DoD52220.22-M
- USA Army 380-19
- USA Navy NAVSO P-5239-26
- IRIG 106-7

Customized modes available upon request.

Hardware triggers

Standard trigger with customized hardware triggers available upon request.



Access Guard

Access Guard is an exclusive Exascend technology that limits access to the flash storage device to a select device or a select number of devices. This makes it impossible for non-approved devices to gain access to data stored within or to write new data to the storage. In approved devices, however, a storage device using Exascend's Access Guard technology behaves just like any normal storage device – making Access Guard a seamless way to enhance security.

AES-256

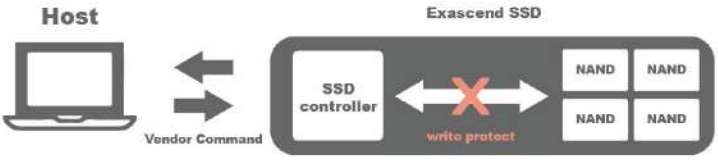
Exascend's secure storage solutions offer the highest level of data protection with virtually unbreakable AES-256 encryption, guaranteeing unbeatable encryption compliant with federal agencies' stringent data security requirements.

TCG Opal 2.0

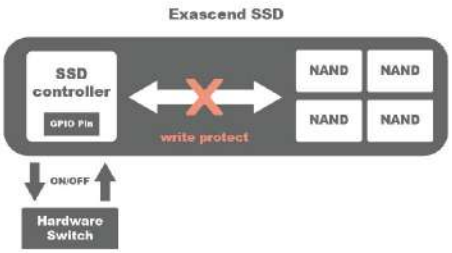
Exascend's secure storage solutions are fully compliant with TCG Opal 2.0 – a set of specifications for SEDs established by the Trusted Computing Group (TCG). Compliance with the TCG Opal 2.0 specifications protects user data from unauthorized access with features such as hardware encryption and LBA-based read/write permissions while guaranteeing industry-wide device interoperability.

Write Protection

Triggered by the user using either firmware or hardware, write protection technology safeguards data stored on the flash storage device by setting it to read-only mode, thereby blocking the host device from deleting or making any changes to the data.



Firmware Write Protection



Hardware Write Protection

Tamper-Proof Firmware

Malicious firmware tampering is a security threat that risks compromising the very heart of the flash storage device, posing a potentially critical threat to device and system security. Tamper-Proof Firmware technology mitigates these risks with firmware encryption featuring a tamper-proof cryptographic signature, guaranteeing that any unauthorized firmware modification is rejected.

Durability

Conformal Coating

Conformal coating is a rugged technology that protects the entire Exascend SSD against environmental threats by applying a water and particle-resistant coating to the printed circuit board and all embedded components.

IP68 and IP67 Compliance

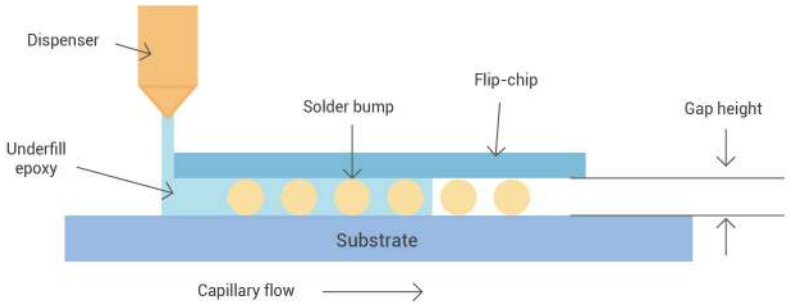
Many of Exascend's storage products come in configurations that adhere to IP68 or IP67 standards, ensuring robust protection against moisture and contaminants. Both IP68 and IP67 ratings offer the highest level of dust protection according to the Ingress Protection Code (IP Code). In terms of water resistance, IP68 guarantees exceptional durability in prolonged immersion in water, whereas IP67 ensures protection against temporary immersion.

MIL-STD-810

With Exascend's MIL-STD-810-compliant products, you get flash storage that has been tested to withstand extreme environmental stress – making them suitable for even the most demanding applications.

Underfill

Underfill is a rugged SSD technology that dramatically reduces the likelihood of BGA-related malfunction by bonding the integrated circuits to the PCB with epoxy.



Integrity

Data Path Protection

From the moment data enters the flash storage device from the host until it reaches its resting place in the NAND flash, data passes through many intermediate points where corruption can occur. Exascend's Data Path Protection ensures the highest level of data integrity by leveraging error-checking throughout the data's entire path from host computer to the NAND flash and back.

Dual Power Loss Protection

Sudden loss of power can cause severe issues in flash storage devices, putting data integrity at risk. Exascend's standard firmware power loss protection provides a first line of defense against these issues. For applications particularly sensitive to loss of power or subject to unstable power supply, Exascend's hardware-based power loss protection provides an invaluable extra line of defense against data integrity issues by leveraging tantalum capacitors that guarantee that all in-flight data is safely stored before controlled storage device shutdown.

Exascend SSD	Hardware PLP	Firmware PLP
M.2	Upon request	V
2.5-inch / U.2 / E1.S	V	V

RAID ECC

Exascend's RAID ECC technology, coupled with our LDPC algorithm, guarantees unmatched error checking and correction capabilities in our flash storage devices. By leveraging RAID5 technology on a flash memory block-level, RAID ECC can retrieve and reconstruct severely corrupted data.

Neutron Shield™

Exascend's Neutron Shield™ technology shields your data from neutron-induced single-event upsets (SEUs). Caused by cosmic rays and other types of ionizing radiation, SEUs jeopardize data integrity in any type of application.

Reliability

Firmware Integrity Plus™

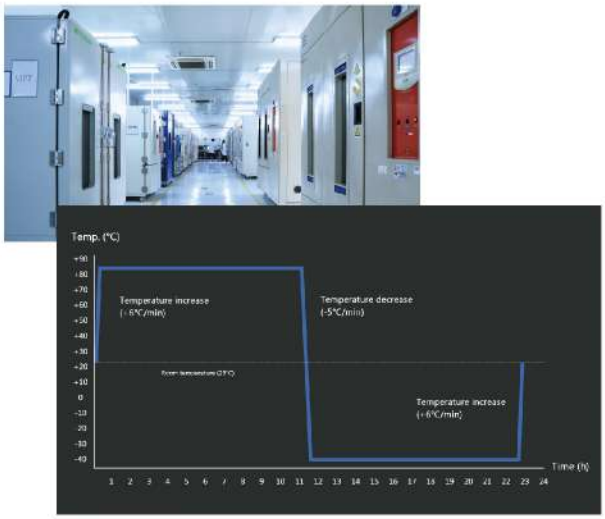
Firmware corruption and firmware loss are rare events that risk rendering storage devices entirely inoperable under critical operation. Firmware Integrity Plus™ is an advanced Exascend-engineered technology that keeps multiple firmware images backed up and ready to replace a faulty firmware image at a moment's notice. Firmware integrity plus provides an extra layer of protection against device malfunction perfect for equipment used in mission-critical applications.

Data Retention Plus™

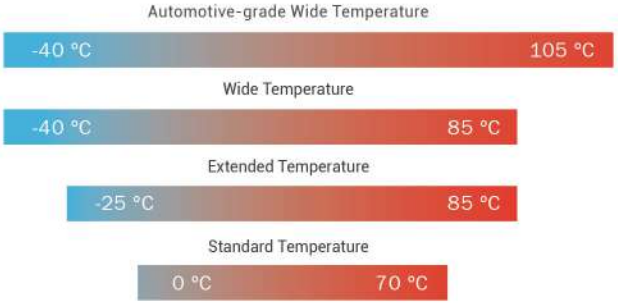
Data Retention Plus™ is an innovative firmware algorithm developed by Exascend. This intelligent solution dynamically refreshes the data stored on flash storage devices, ensuring the utmost reliability of the data stored in the NAND flash.

Wide Temperature

Extreme-temperature environments poses a major challenge to flash storage devices, requiring high-end components and a thermally-optimized design to guarantee stable operation in -40–85 °C (-40–185 °F) or even -40–105 °C (-40–221°F) temperature ranges. Exascend's wide temperature-optimized storage solutions use only the best components, are perfectly engineered and manufactured for demanding operation and undergo stringent validation to guarantee flawless operation in thermally challenging applications.

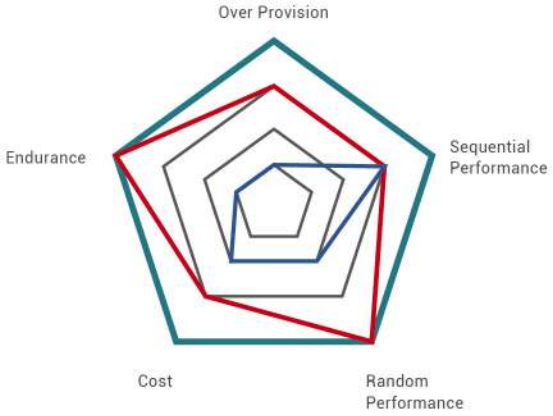


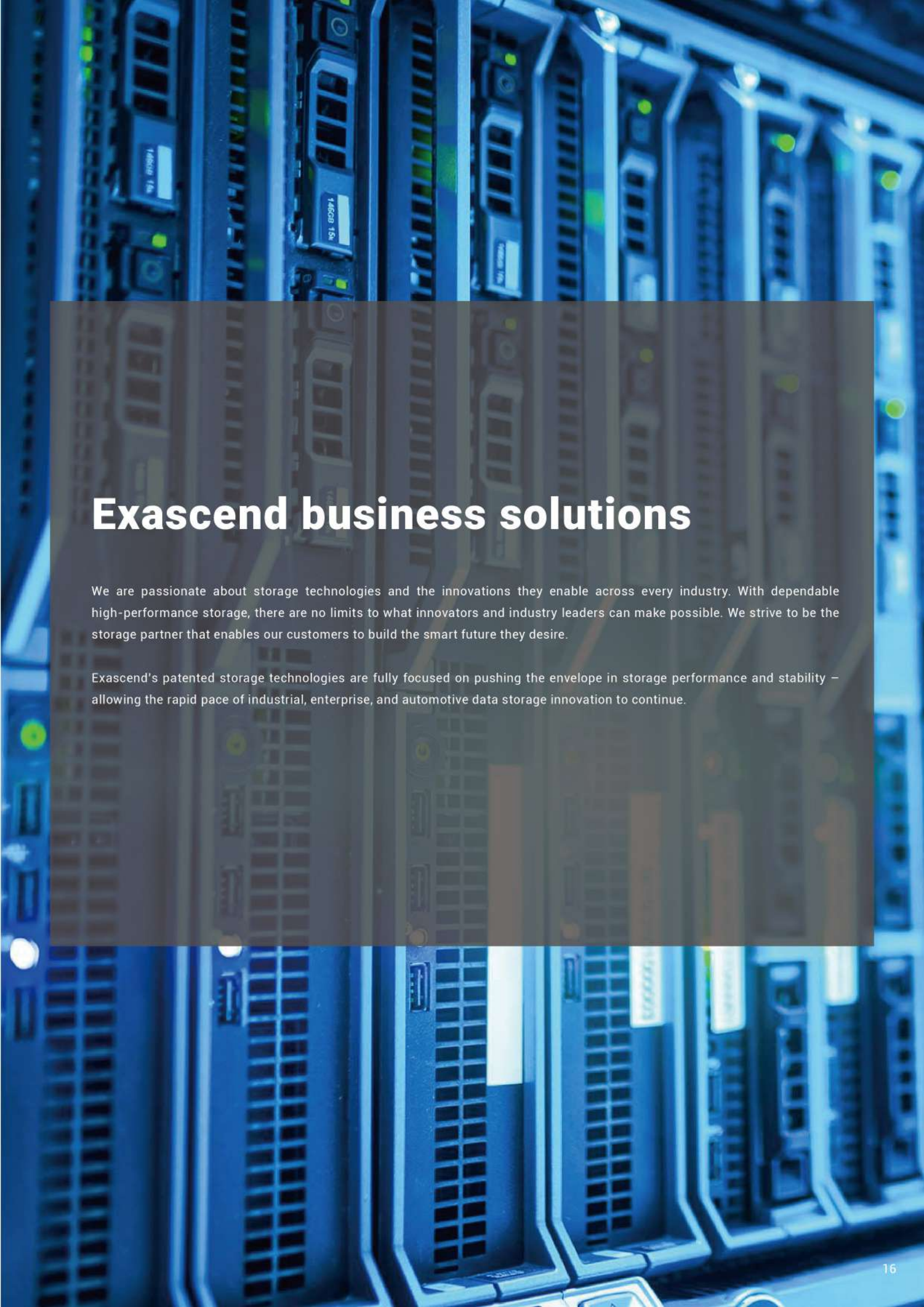
Extreme-temperature chamber testing at one of Exascend's manufacturing facilities.



Unlimited Over-Provisioning

Over-provisioning (OP) is an important technology that allows storage devices to be configured to achieve specific performance profiles suitable for specific workloads and operational requirements. With Exascend's flash storage devices, over-provisioning is completely unlocked, allowing us to meet your exact needs without being limited to the industry-standard 7% and 28% rates of over-provisioning – ensuring that your application can reach its full potential.





Exascend business solutions

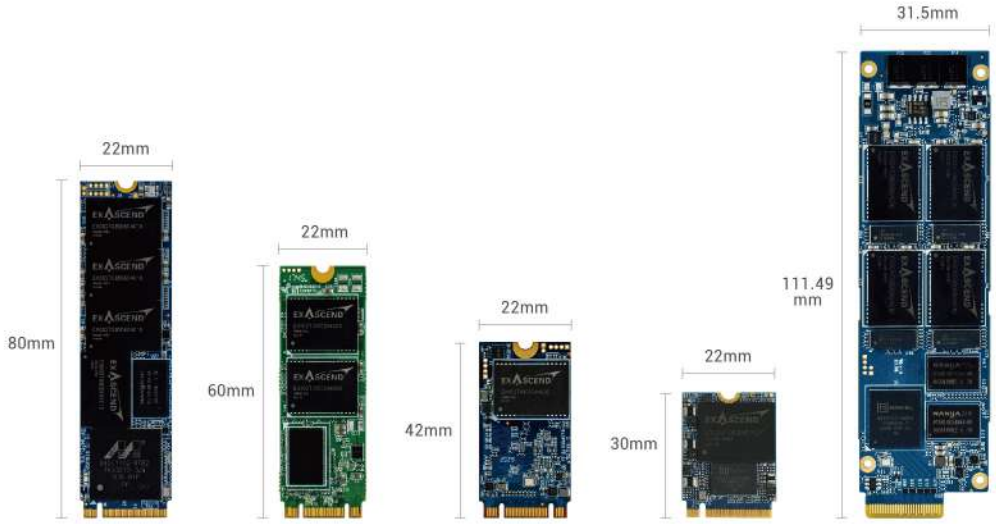
We are passionate about storage technologies and the innovations they enable across every industry. With dependable high-performance storage, there are no limits to what innovators and industry leaders can make possible. We strive to be the storage partner that enables our customers to build the smart future they desire.

Exascend's patented storage technologies are fully focused on pushing the envelope in storage performance and stability – allowing the rapid pace of industrial, enterprise, and automotive data storage innovation to continue.

Product dimensions

SSD

M.2 2280 | M.2 2260 | M.2 2242 | M.2 2230 | E1.S

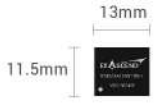


2.5"/U.2 | U.3 | mSATA

Thickness: 7mm

Thickness: 15mm

e.MMC



Industrial

Industrial-grade SSD, memory cards, and managed NAND flash storage solutions engineered to provide the industry's best performance and endurance in rugged applications.

Highlights:

- Wide temperature: -40–85°C
- Up to 15.36TB ultra-high capacity
- Industrial-grade PCIe NVMe and SATA-III SSDs in M.2, 2.5", U.2, E1.S and mSATA form factors
- CompactFlash, SD and microSD memory cards for data logging, surveillance and automotive applications
- e.MMC for IoT gateways, embedded PCs, factory automation, drones, and other industrial applications
- Advanced technologies: LDPC ECC, TCG Opal, AES-256, IOPS optimization, secure erase, power loss protection, pSLC, and more

SSD

PCIe 4.0

PI4

PCIe 3.0

PI3

SATA-III

SI4

SI3

Memory Card

CFexpress & CFast

CFB300

CFS300

SD & microSD

SD300

microSD300

Managed NAND

e.MMC

EM300

EM100

PI4 Series

PCIe Gen4 x4 M.2/E1.S/U.2





Form factor	M.2 2280	M.2 2242	M.2 2230	E1.S	U.2
Flash type	176-layer 3D TLC				
Capacity	240GB~7,680GB			960GB~7,680GB	
Input voltage	3.3V ±5%			12V ±10%	
Power consumption	Active <12W; Idle <1W				
Max. seq. read/write	3,200/3,000 MB/s			3,500/3,000 MB/s	
4K random read/write	400,000/50,000 IOPS			500,000/55,000 IOPS	
Operational temp.	-40°C~85°C				
Max. TBW (JESD218)	4,800 TB	1,200 TB	600 TB	4,800 TB	4,800 TB
Max. DWPD (JESD218)	0.6 @ 3 years				
MTBF	2,000,000 hours				
Warranty	3 years				
Ordering information	EXPI4M960GB EXPI4M1920GB EXPI4M3840GB EXPI4M7680GB	EXPI4Q960GB EXPI4Q1920GB	EXPI4R240GB EXPI4R480GB EXPI4R960GB	EXPI3U480GB EXPI3U960GB EXPI3U1920GB EXPI3U3840GB EXPI3U7680GB	EXPI3U15360GB

PI3 Series

PCIe Gen3 x4 M.2/U.2



Form factor	M.2 2280	U.2 (7mm)	U.2 (15mm)
Flash type	3D TLC		
Capacity	240GB~3,840GB	480GB~7,680GB	15,360GB
Input voltage	3.3V ±5%	12V ±10%	12V ±10%
Power consumption	Active <12W; Idle <1.5W	Active <9W; Idle <1.5W	Active <20W; Idle <3W
Max. seq. read/write	3,100/1,600 MB/s	3,100/1,600 MB/s	3,500/3,500 MB/s
4K random read/write	310,000/30,000 IOPS	310,000/30,000 IOPS	700,000/600,000 IOPS
Operational temp.	-40°C~85°C	-40°C~85°C	-30°C~70°C
Max. TBW (JESD219)	4,800 TB	4,800 TB	9,600 TB
Max. DWPD (JESD219)	0.6 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXPI3M240GB EXPI3M480GB EXPI3M960GB EXPI3M1920GB EXPI3M3840GB	EXPI3U480GB EXPI3U960GB EXPI3U1920GB EXPI3U3840GB EXPI3U7680GB	EXPI3U15360GB

- Warranty valid for the stated number or years or until the device has reached the guaranteed TBW
- DWPD stands for Drive Writes Per Day. TBW = DWPD * capacity * warranty * 365/1000
- pSLC version available upon request for M.2 2280 and U.2 SSDs
- Pro version of SSDs with DWPD rated at 1.5 available upon request

SI4 Series

SATA-III M.2/2.5"/mSATA



Form factor	M.2 2280	2.5"	mSATA
Flash type	176-layer 3D TLC		
Capacity	240GB~7,680GB	240GB~7,680GB	120GB~960GB
Input voltage	3.3V ±5%	5.0V ±10%	3.3V ±5%
Power consumption	Active <5W; Idle <0.9W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/20,000 IOPS	98,000/20,000 IOPS	98,000/20,000 IOPS
Operational temp.	-40°C~85°C		
Max. TBW (JESD219)	8,000 TB	8,000 TB	600 TB
Max. DWPD (JESD219)	0.6 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXSI4M240GB EXSI4M480GB EXSI4M960GB EXSI4M1920GB EXSI4M3840GB EXSI4M7680GB	EXSI4A240GB EXSI4A480GB EXSI4A960GB EXSI4A1920GB EXSI4A3840GB EXSI4A7680GB	EXSI4B120GB EXSI4B240GB EXSI4B480GB EXSI4B960GB

SI4 (Max) Series

SATA-III M.2/2.5"/mSATA



Form factor	M.2 2280	2.5"	mSATA
Flash type	176-layer 3D TLC		
Capacity	240GB~960GB	240GB~960GB	120GB~240GB
Input voltage	3.3V ±5%	5.0V ±10%	3.3V ±5%
Power consumption	Active <5W; Idle <0.9W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/72,000 IOPS	98,000/72,000 IOPS	85,000/60,000 IOPS
Operational temp.	-40°C~85°C		
Max. TBW (JESD219)	8,500 TB	8,500 TB	600 TB
Max. DWPD (JESD219)	5 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXSI4M240GB-X EXSI4M480GB-X EXSI4M960GB-X	EXSI4A120GB-X EXSI4A240GB-X EXSI4A480GB-X EXSI4A960GB-X	EXSI4B120GB-X EXSI4B240GB-X

SI3 Series

PCIe Gen3 x4 M.2/U.2



Form factor	M.2 2280	2.5"	mSATA
Flash type	176-layer 3D TLC		
Capacity	240GB~7,680GB	240GB~7,680GB	120GB~960GB
Input voltage	3.3V ±5%	5.0V ±10%	3.3V ±5%
Power consumption	Active <5W; Idle <0.9W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/20,000 IOPS	98,000/20,000 IOPS	98,000/20,000 IOPS
Operational temp.	-40°C~85°C		
Max. TBW (JESD219)	8,000 TB	8,000 TB	600 TB
Max. DWPD (JESD219)	5 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXSI3M240GB EXSI3M480GB EXSI3M960GB EXSI3M1920GB EXSI3M3840GB EXSI3A7680GB	EXSI3A240GB EXSI3A480GB EXSI3A960GB EXSI3A1920GB EXSI3A3840GB EXSI3A7680GB	EXSI3B120GB EXSI3B240GB EXSI3B480GB EXSI3B960GB

SI3 (Max) Series

SATA-III M.2/2.5"/mSATA



Form factor	M.2 2280	2.5"	mSATA
Flash type	176-layer 3D TLC		
Capacity	240GB~960GB	120GB~960GB	120GB~240GB
Input voltage	3.3V ±5%	5.0V ±10%	3.3V ±5%
Power consumption	Active <5W; Idle <0.9W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/72,000 IOPS	98,000/72,000 IOPS	85,000/60,000 IOPS
Operational temp.	-40°C~85°C		
Max. TBW (JESD219)	8,500 TB	8,500 TB	2,200 TB
Max. DWPD (JESD219)	5 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXSI3M240GB-X EXSI3M480GB-X EXSI3M960GB-X	EXSI3A120GB-X EXSI3A240GB-X EXSI3A480GB-X EXSI3A960GB-X	EXSI3B120GB-X EXSI3B240GB-X

- Warranty valid for the stated number or years or until the device has reached the guaranteed TBW
- DWPD stands for Drive Writes Per Day. TBW = DWPD * capacity * warranty * 365/1000
- pSLC version available upon request for M.2 2280 and U.2 SSDs

CFB300 Series

PCIe Gen3 x2 CFexpress Type B

Form factor	CFexpress Type B
Flash type	176-layer 3D TLC
Capacity	128GB~1,024GB
Input voltage	3.3V ±5%
Power consumption	Active <4.5W; Idle <0.8W
Max. seq. read/write	1,800/1,500 MB/s
4K random read/write	200,000/180,000 IOPS
Operational temp.	-40°C~85°C
Max. TBW (JESD218)	600 TB
MTBF	2,000,000 hours
Warranty	3 years
Ordering information	EXPC3S128GB-I EXPC3S256GB-I EXPC3S512GB-I EXPC3S001TB-I

CFS300 Series

SATA-III, 6.0Gbps CFast 2.0

Form factor	CFast 2.0
Flash type	128GB~1,024GB
Capacity	176-layer 3D TLC NAND
Input voltage	3.3V±5%
Power consumption	Active <6W; Idle <0.5W
Max. seq. read/write	520 MB/s
4K random read/write	85,000/70,000 IOPS
Operational temp.	-40°C~85°C
Max. TBW (JESD219)	600 TB
MTBF	2,000,000 hours
Warranty	3 years
Ordering information	EXSD3X128GB-I EXSD3X256GB-I EXSD3X512GB-I EXSD3X001TB-I

- Warranty valid for the stated number or years or until the device has reached the guaranteed TBW
- DWPD stands for Drive Writes Per Day. TBW = DWPD • capacity • warranty • 365/1000
- pSLC version available upon request for M.2 2280 and U.2 SSDs
- Pro version of SSDs with DWPD rated at 1.5 available upon request

SD300 Series

SD UHS-I

Form factor	SDXC/SDHC	
Capacity	8GB~16GB	32GB~512GB
Flash type	pSLC (176-layer 3D TLC)	176-layer 3D TLC
Input voltage	2.7~3.6V	
Max. seq. read/write	90/80 MB/s	
Speed Class	C10, U3, V30	
Performance Class	A2	
Operational temp.	-40°C~85°C	
Max. TBW	1,210 TB	
Max. DWPD	2.16 @ 3 years	
Warranty	3 years	
Ordering information	EX8GSDV30-PIDE EX16GSDV30-PIDE	EX32GSDV30-IDE EX64GSDV30-IDE EX128GSDV30-IDE EX256GSDV30-IDE EX512GSDV30-IDE

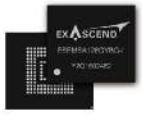
microSD300 Series

SD UHS-I

Form factor	microSDHC/SDXC	
Capacity	8GB~16GB	32GB~256GB
Flash type	pSLC (176-layer 3D TLC)	176-layer 3D TLC
Input voltage	2.7~3.6V	
Max. seq. read/write	90/80 MB/s	
Speed Class	C10, U3, V30	
Performance Class	A2	
Operational temp.	-40°C~85°C	
Max. TBW	610 TB	
Max. DWPD	2.1 @ 3 years	
Warranty	3 years	
Ordering information	EX8GUSDU1-PIDE EX16GUSDU1-PIDE	EX32GUSDU1-IDE EX64GUSDU1-IDE EX128GUSDU1-IDE EX256GUSDU1-IDE

EM300 Series

JEDEC e.MMC 5.1



Form factor	e.MMC 5.1	
Data transfer mode	HS400 DDR mode	
Capacity	4GB~8GB	16GB~128GB
Flash type	MLC	3D TLC
Max. seq. read/write	250/115 MB/s	295/197 MB/s
4K random read/write	4,200/4,400 IOPS	8,200/7,100 IOPS
Input voltage	3.3V ±5%	
Power consumption	Active <3.3W; Idle <1.8W	
Operational temp.	-40°C~85°C	
Max. TBW (JESD218)	23 TB	305 TB
Max. DWPD (JESD218)	1.5	1.3
Warranty	3 years	
Ordering information	ESEMSA004GQBG-I ESEMSA008GQBG-I	ESEMSA016GYBG-I ESEMSA032GYBG-I ESEMSA064GYBG-I ESEMSA128GYBG-I

EM100 Series

JEDEC e.MMC 5.1

Form factor	e.MMC 5.1	
Data transfer mode	HS400 DDR mode	
Capacity	4GB~8GB	16GB~128GB
Flash type	MLC	3D TLC
Max. seq. read/write	250/115 MB/s	295/197 MB/s
4K random read/write	4,200/4,400 IOPS	8,200/7,100 IOPS
Input voltage	3.3V ±5%	
Power consumption	Active <3.3W; Idle <1.8W	
Operational temp.	-25°C~85°C	
Max. TBW (JESD218)	23 TB	305 TB
Max. DWPD (JESD218)	1.5	1.3
Warranty	3 years	
Ordering information	ESEMSA004GQBG ESEMSA008GQBG	ESEMSA016GYBG ESEMSA032GYBG ESEMSA064GYBG ESEMSA128GYBG

Enterprise

Enterprise-class SSDs designed to deliver maximum sustained performance under tough enterprise workloads, such as those found in data centers.

Highlights:

- Standard temperature: 0–70°C
- Up to 30.72 TB enormous capacity
- PCIe NVMe and SATA-III SSDs in M.2, 2.5", U.2/U.3, and E1.S form factors
- Optimized for cloud computing, artificial intelligence (AI), machine learning (ML), content delivery networks (CDN), web streaming, and other I/O-intensive tasks
- Advanced technologies: LDPC ECC, AES-256, power loss protection, hard-plug, and more

SSD

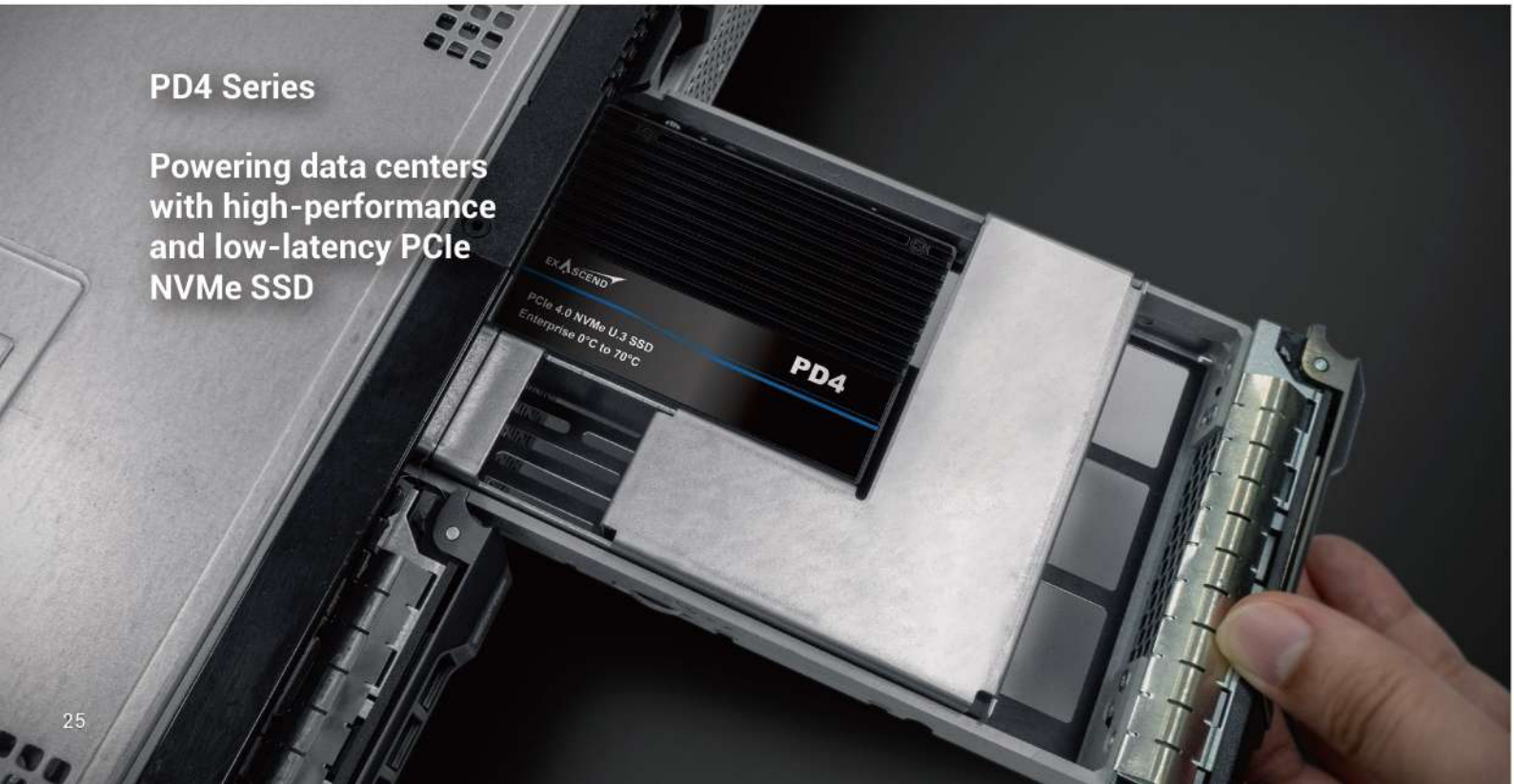
PCIe 4.0

PD4

PE4

SATA-III

SE4



PD4 Series

PCIe Gen4 x4 U.3

Form factor	U.3	
Edition	PD4 Max (Mixed-use)	PD4 Pro (Read-centric)
Flash type	176-layer 3D TLC	
Capacity	6,400GB, 12,800GB, 25,600GB	7,680GB, 15,360GB, 30,720GB
Input voltage	3.3V ±5%	12V ±10%
Power consumption	Active <12W; Idle <1W	
Max. seq. read/write (128KB)	7.1/7.0 GB/s	7.1/7.0 GB/s
4K random read/write	1,600,000/680,000 IOPS	1,600,000/420,000 IOPS
Latency (read/write)	69µs/9µs	
Operational temp.	0°C~70°C	
Max. TBW (JESD219)	150,560 TB	82,120 TB
Max. DWPD (JESD219)	3.3 @ 5 years	1.5 @ 5 years
MTBF	2,000,000 hours	
Warranty	5 years	
Ordering information	EXPD4U6400GB EXPD4U12800GB EXPD4U25600GB	EXPD4U7680GB EXPD4U15360GB EXPD4U30720GB

PE4 Series

PCIe Gen3 x4 M.2/U.2

Form factor	M.2 2280	M.2 2242	M.2 2230	E1.S	U.2
Flash type	176-layer 3D TLC				
Capacity	240GB~7,680GB			960GB~7,680GB	
Input voltage	3.3V ±5%			12V ±10%	
Power consumption	Active <12W; Idle <1W				
Max. seq. read/write	3,200/3,000 MB/s			3,500/3,000 MB/s	
4K random read/write	400,000/50,000 IOPS			500,000/55,000 IOPS	
Operational temp.	0°C~70°C				
Max. TBW (JESD218)	8,000 TB	2,000 TB	1,000 TB	8,000 TB	8,000 TB
Max. DWPD (JESD218)	0.6 @ 5 years				
MTBF	2,000,000 hours				
Warranty	5 years				
Ordering information	EXPE4M960GB EXPE4M1920GB EXPE4M3840GB EXPE4M7680GB	EXPE4Q960GB EXPE4Q1920GB	EXPE4R240GB EXPE4R480GB EXPE4R960GB	EXPE4E960GB EXPE4E1920GB EXPE4E3840GB EXPE4E7680GB	EXPE4U960GB EXPE4U1920GB EXPE4U3840GB EXPE4U7680GB

SE4 (Boot & Streaming) Series

SATA-III, 6.0Gbps M.2/2.5"

Form factor	M.2 2280		2.5"
Edition	Boot	Streaming	Streaming
Flash type	176-layer 3D TLC		
Capacity	240GB~480GB	240GB~7,680GB	240GB~15,360GB
Input voltage	3.3V ±5%	3.3V ±5%	5V ±5%
Power consumption	Active <5W; Idle <0.9W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/20,000 IOPS	98,000/20,000 IOPS	98,000/20,000 IOPS
Operational temp.	0°C~70°C		
Max. TBW (JESD219)	866 TB	8,000 TB	16,000 TB
Max. DWPD (JESD219)	1 @ 5 years	0.6 @ 5 years	
MTBF	2,000,000 hours		
Warranty	5 years		
Ordering information	EXSE4M240GB-T EXSE4M480GB-T	EXSE4M480GB EXSE4M960GB EXSE4M1920GB EXSE4M3840GB EXSE4M7680GB EXSE4M240GB-WP (w/PLP) EXSE4M480GB-WP (w/PLP)	EXSE4A240GB EXSE4A480GB EXSE4A960GB EXSE4A1920GB EXSE4A3840GB EXSE4A7680GB EXSE4A15360GB

SE4 (Pro & Max) Series

SATA-III, 6.0Gbps M.2/2.5"

Form factor	M.2 2280		2.5"	
Edition	Pro	Max	Pro	Max
Flash type	176-layer 3D TLC			
Capacity	480GB~1,920GB	240GB~960GB	480GB~3,840GB	240GB~960GB
Input voltage	3.3V ±5%		5V ±5%	
Power consumption	Active <4.1W; Idle <0.8W			
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/42,000 IOPS	98,000/72,000 IOPS	98,000/42,000 IOPS	98,000/72,000 IOPS
Latency (read/write)	0°C~70°C			
Operational temp.	110µs/40µs			
Max. TBW (JESD219)	8,000 TB	8,500 TB	11,000 TB	17,000 TB
Max. DWPD (JESD219)	1.5 @ 5 years	5 @ 5 years	1.5 @ 5 years	5 @ 5 years
MTBF	2,000,000 hours			
Warranty	5 years			
Ordering information	EXSE4M480GB-P EXSE4M960GB-P EXSE4M1920GB-P	EXSE4M240GB-X EXSE4M480GB-X EXSE4A960GB-X	EXSE4A480GB-P EXSE4A960GB-P EXSE4A1920GB-P EXSE4A3840GB-P	EXSE4A240GB-X EXSE4A480GB-X EXSE4A960GB-X

Automotive

High-performance, high-capacity flash memory solutions built for automotive data storage, with extreme temperature resistance from -40°C to 85°C or even 105°C.

Highlights:

- Standard temperature: 0–70°C
- Up to 7.68 TB high capacity
- PCIe NVMe and SATA-III SSDs in M.2, 2.5", U.2, and E1.S form factors
- SD cards, microSD cards and e.MMC memory for automotive applications including ADAS, infotainment, navigation systems, and high-definition mapping
- Advanced technologies: LDPC ECC, power loss protection, conformal coating, secure erase, power loss protection, and more
- IATF 16949 certified; AEC-Q100 certification in progress

SSD

PCIe 4.0

PA4

SATA-III

SA4

Memory Card

microSD

microSD500

Managed NAND

e.MMC

EM500

PA4 Series

PCIe Gen4 x4 M.2/E1.S/U.2

Form factor	M.2 2280	M.2 2242	M.2 2230	E1.S	U.2
Flash type	176-layer 3D TLC				
Capacity	240GB~7,680GB			960GB~7,680GB	
Input voltage	3.3V ±5%			12V ±10%	
Power consumption	Active <7W; Idle <1W				
Max. seq. read/write	3,200/3,000 MB/s			3,500/3,000 MB/s	
4K random read/write	400,000/50,000 IOPS			500,000/55,000 IOPS	
Operational temp.	-40°C~85°C				
Max. TBW (JESD218)	4,800 TB	1,200 TB	600 TB	4,800 TB	4,800 TB
Max. DWPD (JESD218)	0.6 @ 3 years				
MTBF	2,000,000 hours				
Warranty	3 years				
Ordering information	EXPA4M960GB EXPA4M1920GB EXPA4M3840GB EXPA4M7680GB	EXPA4Q960GB EXPA4Q1920GB	EXPA4R240GB EXPA4R480GB EXPA4R960GB	EXPA4E960GB EXPA4E1920GB EXPA4E3840GB EXPA4E7680GB	EXPA4U960GB EXPA4U1920GB EXPA4U3840GB EXPA4U7680GB

SA4 Series

SATA-III, 6.0Gbps M.2/2.5"

Form factor	M.2 2280	2.5"	mSATA
Flash type	176-layer 3D TLC		
Capacity	240GB~7,680GB	240GB~7,680GB	240GB~960GB
Input voltage	3.3V ±5%	5.0V ±10%	3.3V ±5%
Power consumption	Active <4W; Idle <0.5W		
Max. seq. read/write	550/535 MB/s	550/535 MB/s	550/535 MB/s
4K random read/write	98,000/20,000 IOPS	98,000/20,000 IOPS	98,000/20,000 IOPS
Operational temp.	-40°C~85°C		
Max. TBW (JESD219)	4,800 TB	4,800 TB	600 TB
Max. DWPD (JESD219)	0.6 @ 3 years		
MTBF	2,000,000 hours		
Warranty	3 years		
Ordering information	EXSA4M240GB EXSA4M480GB EXSA4M960GB EXSA4M1920GB EXSA4M3840GB EXSA4M7680GB	EXSA4A240GB EXSA4A480GB EXSA4A960GB EXSA4A1920GB EXSA4A3840GB EXSA4A7680GB	EXSA4B240GB EXSA4B480GB EXSA4B960GB

microSD500 Series

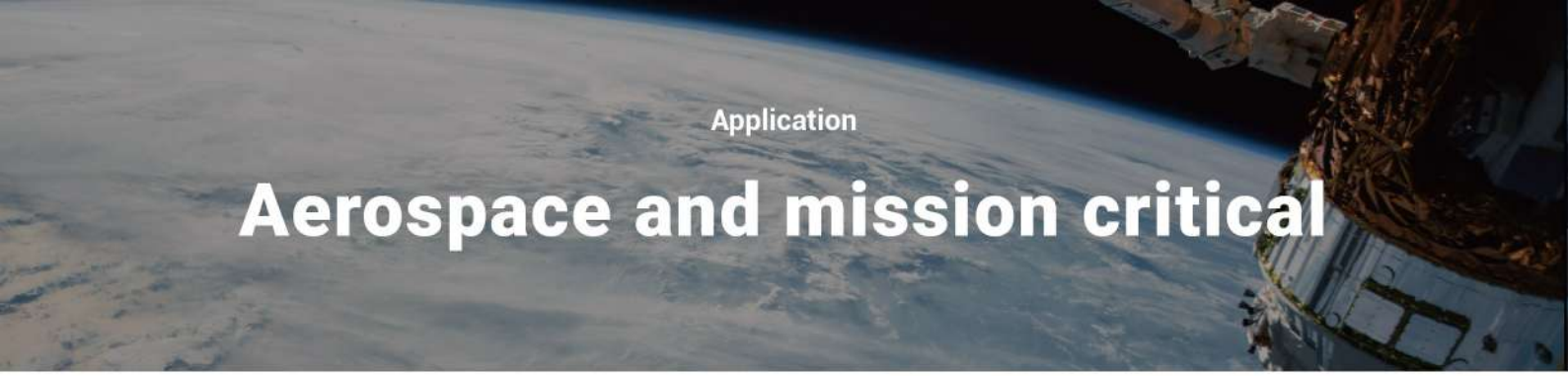
SD UHS-I

Form factor	microSDHC/SDXC	
Capacity	8GB~16GB	32GB~256GB
Flash type	pSLC (176-layer 3D TLC)	176-layer 3D TLC
Input voltage	2.7~3.6V	
Max. seq. read/write	90/80 MB/s	
Speed Class	C10, U3, V30	
Performance Class	A2	
Operational temp.	-40°C~105°C	
Max. TBW	610 TB	
MTBF	2,000,000 hours	
Warranty	3 years	
Ordering information	EX8GUSDV30-PTDE EX16GUSDV30-PTDE	EX32GUSDV30-TDE EX64GUSDV30-TDE EX128GUSDV30-TDE EX256GUSDV30-TDE

EM500 Series

JEDEC e.MMC 5.1

Form factor	e.MMC 5.1	
Data transfer mode	HS400 DDR mode	
Capacity	4GB~16GB	32GB~256GB
Flash type	pSLC (176-layer 3D TLC NAND)	176-layer 3D TLC NAND
Max. seq. read/write	280/205 MB/s	295/210 MB/s
4K random read/write	8,300/5,300 IOPS	8,400/6,000 IOPS
Input voltage	3.3V ±5%	
Power consumption	Active <3.3W; Idle <1.8W	
Operational temp.	-40°C~105°C	
Max. TBW (JESD218)	382 TB	614 TB
Max. DWPD (JESD218)	26.6 @ 3 years	2.33 @ 3 years
Warranty	3 years	
Ordering information	ESEMSA004GPMG-T ESEMSA008GPMG-T ESEMSA016GPMG-T	ESEMSA032GYMG-T ESEMSA064GYMG-T ESEMSA128GYMG-T ESEMSA256GYMG-T



Application

Aerospace and mission critical

Mission-critical and aerospace applications present a diverse array of challenges, such as extreme heat, freezing temperatures, arid climates, humid environments, mechanical stress, magnetism, and electrical interference. These demanding conditions necessitate reliable operation, watertight security, and high storage capacity.

Exascend provides industry-leading rugged SSDs available in various form factors and capacities, tailored to meet the data storage needs of rugged computers, unmanned aerial vehicles (UAVs), aircraft, satellites, communication stations, and other critical applications within the aerospace and mission-critical sectors. Our products fully comply with the Trade Agreements Act (TAA), and we offer highly customizable storage solutions, allowing for unique form factor options, encryption, and data purging capabilities.

Featured storage technologies

- Ruggedized to Resist Shock and Vibration
- Uncompromised Data Integrity
- Wide Temperature
- Data Security and Encryption
- Dual Power Loss Protection (PLP)
- Thermal and Performance Optimization

Why we are different

Customization through Our Own Hardware and Firmware Design	In-House Product Design, Validation, Manufacturing and Testing Capabilities
Our complete control over our hardware and firmware solutions, combined with our commitment to customization, allows us to address customer pain points and solve unique challenges. From selecting the ideal materials to writing the firmware source code, we work closely with our customers to deliver tailored solutions that meet their specific needs.	Our ISO9001-certified quality management system (QMS) includes product traceability and 100% mass production (MP) testing before shipment, ensuring our products meet the highest standards of quality and reliability. As a result, we have been a trusted supplier to some of the Fortune 500 companies for years.

Use cases

Truly unique form factor with ten SATA SSDs and 10-20 TB of storage on a single PCB combined with an advanced anti-shock and vibration-proof connector and PCB design, for an extremely challenging defense telemetry application.

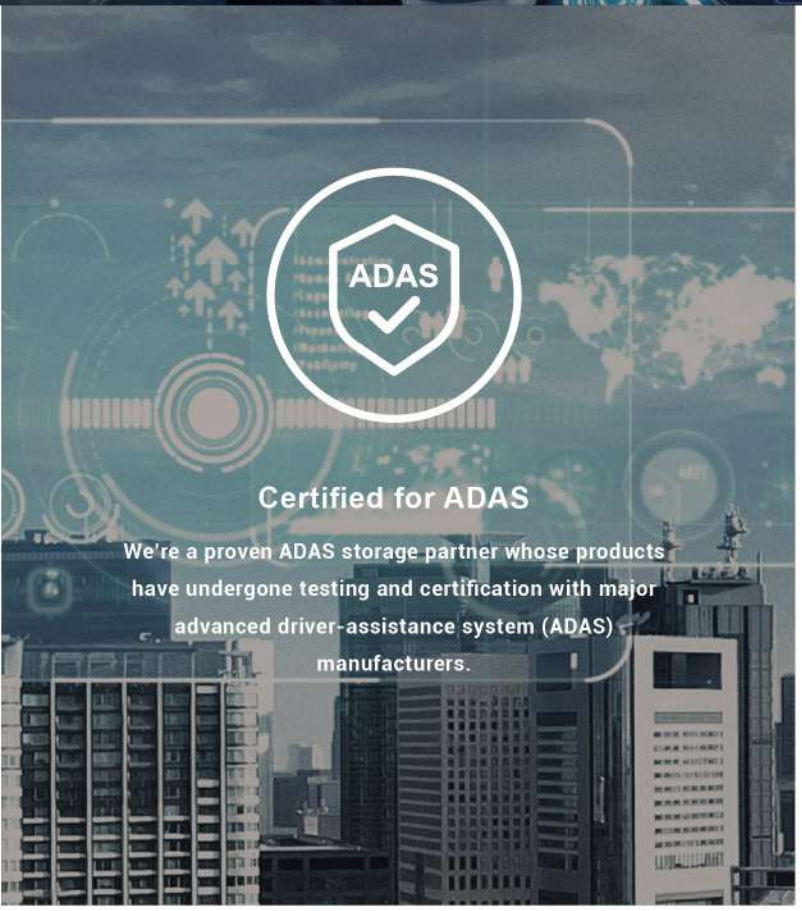
M.2 PCIe SSD featuring hardware power loss protection (PLP) and custom data sanitization, for a rugged laptop storing sensitive data and operating in harsh environments.

E1.S NVMe SSD featuring hardware power loss protection (PLP) and MIL-I-46058C conformal coating, for a next-generation data logger employed on an aircraft.

Application

Self-Driving

Automotive



Data center on wheels

As automobiles become more technologically advanced, connected cars have become data centers on wheels, generating a vast amount of data captured by in-vehicle applications – leading to advanced and personalized infotainment and safer driving experiences. Thus, automobile OEMs and Tier 1 suppliers require high-performance, high-capacity, high-endurance, and reliable storage solutions.

Exascend's automotive-grade storage solutions are designed to address the challenges of automotive data storage. Our storage solutions support a range of automotive applications, including advanced driver assistance systems (ADAS), in-vehicle infotainment (IVI) systems, black box recorders, vehicle-to-everything (V2X) communications, and more. Our fully customizable SSDs and memory cards are built to withstand extreme temperatures, shock, vibration, and cyber threats, making them ideal for automotive use.

Featured storage technologies

- Data Security and Encryption
- Dual Power Loss Protection (PLP)
- Wide Temperature
- NVMe and SATA SSD in Various Form Factors
- Thermal and Performance Optimization
- IATF 16949 Certified

Next-generation form factors – or something special

Why limit yourself to form factors optimized for consumer products and controlled environments?
We love the standard M.2 and 2.5" form factors, but that doesn't mean that they're the perfect form factors for every application. That's why we offer next-generation form factors like E1.S and U.2 that have performance and thermal profiles ideal for applications like ADAS and data logging. But why stop there – we also provide fully customized form factors tailored for your application and its unique requirements.

Exascend automotive & ADAS solutions

The ADAS data challenge

Advanced driver-assistance systems (ADAS) generate extreme amounts of data through their numerous **sensors**, **LiDAR**, **cameras** and more.

More accurate systems = more data = **higher data rates and larger storage capacities** required:

- **In 2017**, Intel and Micron found that ADAS requires around **1 GB** of data to be processed per second.
- In Intel's latest Mobileye system, EyeQ5 from **2020**, up to **7.25 GB/s** of data must be processed each second.
- In next-generation systems, **even higher bitrates** are required.

2017

1 GB/s

2020

7.25 GB/s

202X

1X.X GB/s

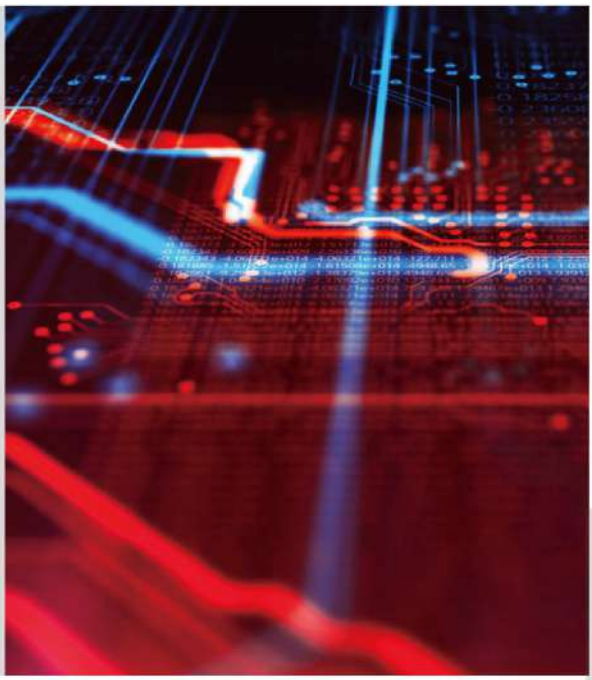
The ADAS power and thermal challenge

Powerful ADAS hardware means high power-draw

- **GPU**: up to **350 W** per installation.
- **Server CPU**: up to **285 W** per installation.
- **Enterprise SSD**: **15–20 W** active power consumption.
- Throttles performance at 149 °F (65 °C), causing **unpredictable performance** and sudden drops in transfer speeds.

Compact ADAS systems and high power-draw means high temperatures

- **Thermal management** is becoming a critical part of high-power systems.
- **Low power** and **intelligent thermal management** are cornerstones in achieving **sustainable high performance.**



The ADAS environmental challenge

Advanced driver-assistance systems face some of the toughest **environmental challenges** imaginable, both from their operating environment and the outside ambient environment.

For example, they're up against...:

- **Extreme temperatures** and sudden swings in temperature.
- **Vibrations**, **shocks and pressure** – both continuous and sudden.
- **Particles**, **contaminants**, **pollution** and **humidity**.

Application

Edge computing

The era of edge computing is upon us. According to Gartner, 75 percent of data will be processed outside traditional centralized data centers and the cloud by 2025.

This represents a paradigm shift for computing as we know it. As more and more data get generated and processed in edge devices that also demands ever-smarter and more powerful hardware on the edge. The rise of edge computing promises a smarter and more convenient life for consumers and a new era of innovation and increased efficiency for corporations. And while the benefits are many, the advent of edge computing also presents a monumental challenge: how do you build future-proof edge infrastructure that is up for the task today and will not incur unexpected costs in the future?

Featured storage technologies

- Ruggedized for Resilience against Humidity, Shock and Vibration
- Optimized Consistent Performance under Thermal Stress
- Industrial Temperature Range of -40°C to +85°C
- Enhanced Power Efficiency
- Uncompromised Data Integrity
- Data Security and Encryption

Recommended products

NVMe SSD: PI4

- PCIe 4.0 / NVMe 1.4
- 176-layer 3D TLC NAND
- Up to 15.36TB capacity
- Up to 3,500 MB/s sustained performance
- Op. temp -40°C to 85°C

e.MMC: EM300

- e.MMC 5.1, 153-ball FBGA
- TLC / MLC NAND
- Up to 128GB capacity
- Up to 295 MB/s performance
- Op. temp -40°C to 85°C

SD Card: SD300

- SD 6.0
- 176-layer 3D TLC NAND
- 8GB / 16GB (pSLC)
- 32GB to 512GB (TLC)
- Up to 90 MB/s performance
- Op. Temp -40°C to 85°C

microSD Card: microSD300

- SD 6.0
- 176-layer 3D TLC NAND
- 8GB / 16GB (pSLC)
- 32GB to 256GB (TLC)
- Up to 90 MB/s performance
- Op. Temp -40°C to 85°C

Application

Servers and data center

Data centers with advanced computing capabilities are now the primary sites where large datasets are utilized to power artificial intelligence (AI) and machine learning (ML) algorithms. In the constantly evolving world of servers and data centers, achieving optimal data storage is met with significant challenges. The need for fast data processing, real-time analytics, and uninterrupted content delivery intensifies the pressure. Moreover, ensuring data integrity, availability, and security amidst this rapid data expansion becomes increasingly complex.

Exascend provides enterprise-grade NVMe and SATA solid-state drives (SSDs) that utilize 3D TLC NAND technology and precise craftsmanship to deliver exceptional and consistent performance, specifically designed to meet the requirements of servers and data centers. Our SSDs are available in standard form factors, including M.2, EDSFF (E1.S), and 2.5-inch (including U.2 and U.3). Our advanced firmware technologies guarantee reliable and long-lasting service, even in challenging environments. Additionally, we offer a variety of optional security features and technologies to enhance data protection and safeguard sensitive information stored within the devices.

Featured storage technologies

- High Capacity, Performance, and Low Latency
- Data Integrity and Retention
- Data Security and Encryption
- Dual Power Loss Protection (PLP)
- Tailored Over-Provisioning Capabilities

Recommended products

NVMe SSD: PD4

- PCIe 4.0 / NVMe 1.4
- 176-layer 3D TLC NAND
- Up to 30.72TB capacity
- Up to 7,100 MB/s sustained performance
- Up to 1600k IOPS 4K random read

NVMe SSD: PE4

- PCIe 4.0 / NVMe 1.4
- 176-layer 3D TLC NAND
- Up to 15.36TB capacity
- Up to 3,500 MB/s sustained performance

SATA SSD: SE4

- SATA 6.0Gb/s
- 176-layer 3D TLC NAND
- Up to 7.68TB capacity
- Up to 550 MB/s sustained performance

Application

Telecommunications

In order to realize the blazing-fast, massive-bandwidth, low-latency future promised by new networking standards, high-performance equipment is required across the entire networking infrastructure – from physical antennas to backend routers. In order to deliver uncompromised performance for end users, components need to be able to handle the extreme workloads associated with widescale networks.

To achieve low latency, every nanosecond matters. Having even the tiniest delay in response can lead to a disappointing next-generation telecommunications experience for end users. As such, only hardware with the capability to process and transmit data at high speeds can provide sufficient connection bandwidth for end users, whether it is consumer devices or edge infrastructure.

In many modern telecommunications applications, energy efficiency and ruggedness are paramount. Telecom infrastructure's massive scale makes maintaining a small energy footprint extremely critical, as is ensuring equipment remains operational everywhere.

Featured storage technologies

- Ruggedized for Resilience against Humidity, Shock and Vibration
- Optimized Consistent Performance under Thermal Stress
- Industrial Temperature Range of -40°C to +85°C
- Enhanced Power Efficiency
- Uncompromised Data Integrity
- Data Security and Encryption

Recommended products

NVMe SSD: PI4

- PCIe 4.0 / NVMe 1.4
- 176-layer 3D TLC NAND
- Up to 15.36TB capacity
- Up to 3,500 MB/s sustained performance
- Op. temp -40°C to 85°C

e.MMC: EM300

- e.MMC 5.1, 153-ball FBGA
- TLC / MLC NAND
- Up to 128GB capacity
- Up to 295 MB/s performance
- Op. temp -40°C to 85°C

SD Card: SD300

- SD 6.0
- 176-layer 3D TLC NAND
- 8GB / 16GB (pSLC)
- 32GB to 512GB (TLC)
- Up to 90 MB/s performance
- Op. Temp -40°C to 85°C

microSD Card: microSD300

- SD 6.0
- 176-layer 3D TLC NAND
- 8GB / 16GB (pSLC)
- 32GB to 256GB (TLC)
- Up to 90 MB/s performance
- Op. Temp -40°C to 85°C

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