

# Apacer

The  
Most **Trusted** Source  
for Industrial SSDs

## SSD Selection Guide

[industrial.apacer.com](http://industrial.apacer.com)



Benefit from our  
**CoreSnapshot**  
Details on p08.

# Index

<b>What Sets Apacer Apart?</b>	02	<b>Nand Flash Products</b>	
<b>Industrial-grade 3D NAND Flash</b>	03	<b>PCIe</b>	
<b>Emergent Technologies</b>	04	M.2	15
<b>Specialty</b>		CFexpress	16
Cloud Series SSD	05	<b>SATA</b>	
Defense Series SSD	06	2.5" SSD	17
<b>Featured Technologies</b>		M.2	19
Anti-Sulfuration	07	SATA MO-276 / MO-297 / MO-300	21
CoreSecurity2	07	SATA 7-pin Module	23
DBS Cloud Edition	07	<b>Card</b>	
CoreSnapshot	08	Industrial CF Card	25
<b>Value-added Technologies</b>		Industrial CFast Card	26
Data Integrity	09	Industrial SD Card	27
Longevity	09	Industrial microSD Card	28
Power Stability	10	<b>USB</b>	
Security	11	Industrial USB Drive	29
Survivability	12	Industrial USB Disk Module	31
<b>Applications</b>	14	<b>PATA</b>	
		PATA SSD/ Disk Module	33
		<b>About Apacer</b>	34



# What Sets Apacer Apart?

## Why Multinational Leaders Depend On Apacer

For over 20 years, the world's top digital device manufacturers have trusted Apacer to supply them with industrial-grade SSDs and DRAM. We supply some of the world's top manufacturers: everyone from established industry giants in defense and healthcare to fast-growing newcomers in IoT and networking. Why do all these top makers turn to us?

- **They know we have one of the strongest firmware development teams in the world**
- **They know we only use brand-name ICs sourced directly from the original manufacturers**
- **They know we have been dedicated to SSD manufacturing and testing for over 20 years**
- **They love the advanced value-adding features we developed and tested in-house**
- **They trust our fixed BOM policy to ensure components remain uniform over time**

We're ready to add your name to the list of our satisfied and successful customers. Browse on to read more about our latest cutting-edge SSDs.

### Industrial-grade 3D NAND Flash

- **A summary of the key advantages**

### Emergent Technologies

- **Proof of our commitment to innovation**

### Specialty

#### Tailor-made for defense and cloud applications

- **Cloud Series**
- **Defense Series**





# Industrial Storage

## 3D NAND Optimization Solutions

SLC-liteX Technology



### Benefits of Apacer's Industrial 3D NAND Flash Memory with Optimization Solutions

- Greater reliability
- P/E cycle up to 30,000 when TLC adopted SLC-liteX
- Higher performance
- Lower power consumption
- Made with original ICs sourced directly from our long-term partners.
- Operating temperature range is as wide as -40°C~+85 °C

# Emergent Technologies

## PCIe BGA SSD

Apacer's PCIe BGA SSDs adopt 3D TLC NAND flash memory and made from the meticulously selected industrial-grade wide-temperature ICs. The advantages of being ultra-lightweight and small, it boasts high-speed performance, ultra-low latency, low power consumption, shock resistance, high stability and reliability. It is ideal for 5G high-speed and miniaturized smart applications.



## NPLink SSD Series

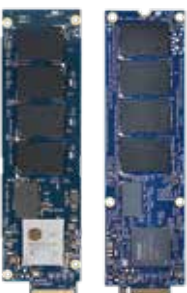
Following the trends of miniaturization and flexible use, Apacer created the world's first patented flexible NPLink SSD module, NP920-NPN. It's a high-speed, high-capacity, highly stable device and supports PCIe NVMe interfaces. Its compact design and 180-degree flexible OCuLink connector makes it ideal for installation in 1U servers and offering users new ways to overcome design limitations.



## CoreGlacier™ Technology



In many applications, SSDs are subject to challenging conditions. If the working environment is already hot, and the SSD's operation causes it to increase in temperature as well, the result could be damage to the hardware or corrupted data. Apacer's CoreGlacier™ presents superior solution to this problem. It cools both the NAND flash and the controller IC, keeping temperatures low, while still allowing an SSD to deliver high-speed performance.



## EDSFF and NGSFF(M.3) SSD

Apacer continuously develops the newest form factor SSDs to deliver flexible solutions for the new revolutionary industry. The EDSFF SSDs and NGSFF SSDs deliver flexible building blocks for scalable solutions, larger capacity, and increase operational efficiency. The easy-to-plug mechanism and compact specifications design is not only easy extraction in compact, interlaced interface devices but also perfectly fits for the new generations data center and server applications.



# Specialty Cloud Series SSD

Apacer Cloud Series SSDs designed to monitor and remote management the typical pain points of an IoT edge device network. In addition, it also supports optional CoreSnapshot technology which can provide a full SSD backup and recovery mechanism in one second when key data is lost or system crashes occur. Cloud Series SSDs are greatly reducing the waiting time for troubleshooting and system downtime.



**CoreAnalyzer2**  
Tool for analyzing enterprise platform usage behavior  
By collecting data from an emulation of the client's host system, it analyzes equipment usage behavior and recommends the most suitable SSD for the system.

**SSDWidget 2.0**  
Comprehensive SSD monitoring and maintenance software  
Can monitor SSD-related information and health status, and provide SSD lifespan and workload analysis.

**CoreSnapshot Technology**  
Recover an SSD's data and OS in just one second  
Full backup and recovery of SSD data can be performed in one second, which can instantly eliminate catastrophic system issues and prevent data damage or downtime translating into operational risks and losses.

## Cloud Series SSDs

Form Factor	2.5"	M.2 2280	M.2 2242	MO-300
<b>Model Name</b>	SV25C-25	SV25C-M280	SV25C-M242	SV25C-300
<b>NAND Flash Type</b>	3D-TLC	3D-TLC	3D-TLC	3D-TLC
<b>Capacity</b>	30GB to 960GB	30GB to 960GB	30GB to 480GB	30GB to 480GB
<b>EST. Seq. R/W Performance (MB/sec)</b>	560/520	560/520	560/515	560/515
<b>EST. IOPS R/W</b>	73K	73K	73K	71K
<b>AES256 Support</b>	Yes	Yes	Yes	Yes
<b>Smart Read Refresh™</b>	Yes	Yes	Yes	Yes
<b>Double-barreled Solution Cloud Edition</b>	Yes	Yes	Yes	Yes
<b>CoreSnapshot</b>	Optional	Optional	No	No
<b>Cloud Vender Support</b>	Advantech DeviceOn, Allxon	Allxon	Allxon	Advantech DeviceOn
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>3,000,000
<b>Standard Operating Temperature (°C)</b>	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70
<b>Wide Temp. (-40 ~ +85 °C)</b>	Yes	Yes	Yes	Yes
<b>Storage Temperature (°C)</b>	-40 ~ 100	-40 ~ 100	-40 ~ 100	-40 ~ 100

\* Note: More detail specification, please refer to [industrial.apacer.com](http://industrial.apacer.com)

# Specialty Defense Series SSD



Apacer knows that defense manufacturers have to meet some of the toughest standards for reliability in any industry. That's why we created our Defense SSD series. By default, all products in this series are tested to ensure they comply with humidity, altitude, thermal shock and thermal cycling tests. Our engineers carry out these tests at our factory in Taiwan using the latest equipment.

## Military Test



### Shock

MIL-STD-202G MIL-STD-883K

### Vibration

MIL-STD-810G

### Humidity

MIL-STD-810G Method 507.5

### High/ Low Temp.

MIL-STD-810G Method 501.5  
MIL-STD-810G Method 502.5

### Thermal Shock

MIL-STD-810G Method 503.5 Procedure I-C

### Altitude

MIL-STD-810G Method 500.6

### Salt fog

MIL-STD-810G Method 509.5

### Radiation Test

MIL-STD-810G Method 505.5 procedur 2

## Defense SSD

Form Factor	2.5"	2.5"	M.2 2280	MO-300
Model Name	SS21D-25	SM23D-25	SM23D-M280	SM23D-300
NAND Flash Type	SLC	MLC	MLC	MLC
Capacity	32GB to 240GB	32GB to 1TB	32GB to 1TB	32GB to 512GB
Seq. R/W Performance (MB/sec)	530/445	560/510	560/510	560/510
IOPS R/W	76K	65K	63K	64K
AES-256	-	Yes	Yes	Yes
TCG Opal 2.0	-	Optional	Optional	Optional
Instant Keychange™	-	HW: Connector pin, pin headers; SW commands	HW: Connector pin; SW commands	HW: Switch, connector pin; SW commands
MIL Erase*				
Digital Destruction	HW: Connector pin, pin headers; SW commands	HW: Connector pin, pin headers; SW commands	HW: Connector pin; SW commands	HW: Switch, connector pin; SW commands
Write Protect				
30u Gold Finger	Optional	Optional	Optional	Optional
Sidefill	Optional	Optional	Yes	Yes
MTBF (hours)	5,000,000	5,000,000	5,000,000	5,000,000
Standard Operating Temperature ( °C )	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85
Storage Temperature ( °C )	-55 ~ 100	-55 ~ 100	-55 ~ 100	-55 ~ 100

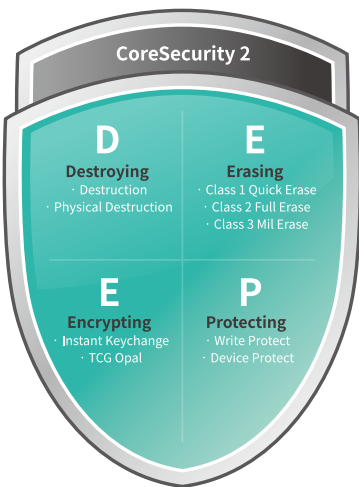
\* Note: NSA9-12, DoD 5220.22-M, NSA Manual 130-2, IREC (IRIG) 106, USA-AF AFSSI 5020, USA-Army 380-19, USA Navy NAVSO P-5239-26, NISPOMSUP Chap 8, Sect. 8-501

# Featured Technologies



## Anti-Sulfuration

Apacer anti-sulfuration technology not only uses special alloy materials but also achieves a complete air barrier through rigorously inspected special materials and technologies to ensure the best protection for electronic products. After two complete accelerated verification tests of MFG (Mixed Fluid Gas and FoS (Flower of Sulfur), it has passed the American National Standards Institute/International Society of Automation 71.04 G3 air corrosion certification.



Truly **DEEP** Security



## CoreSecurity2

CoreSecurity2 is a proprietary data protection technology built into Apacer SSD products. It is crucial for mission-critical applications, where data erasure, drive sanitization, and reliability of storage are essential requirements. CoreSecurity2 provides four technologies, including: Destroying, Erasing, Encrypting and Protecting. It is designed with exclusive software commands to meet clients' requirements of a high level of data protection.



## DBS Cloud Edition

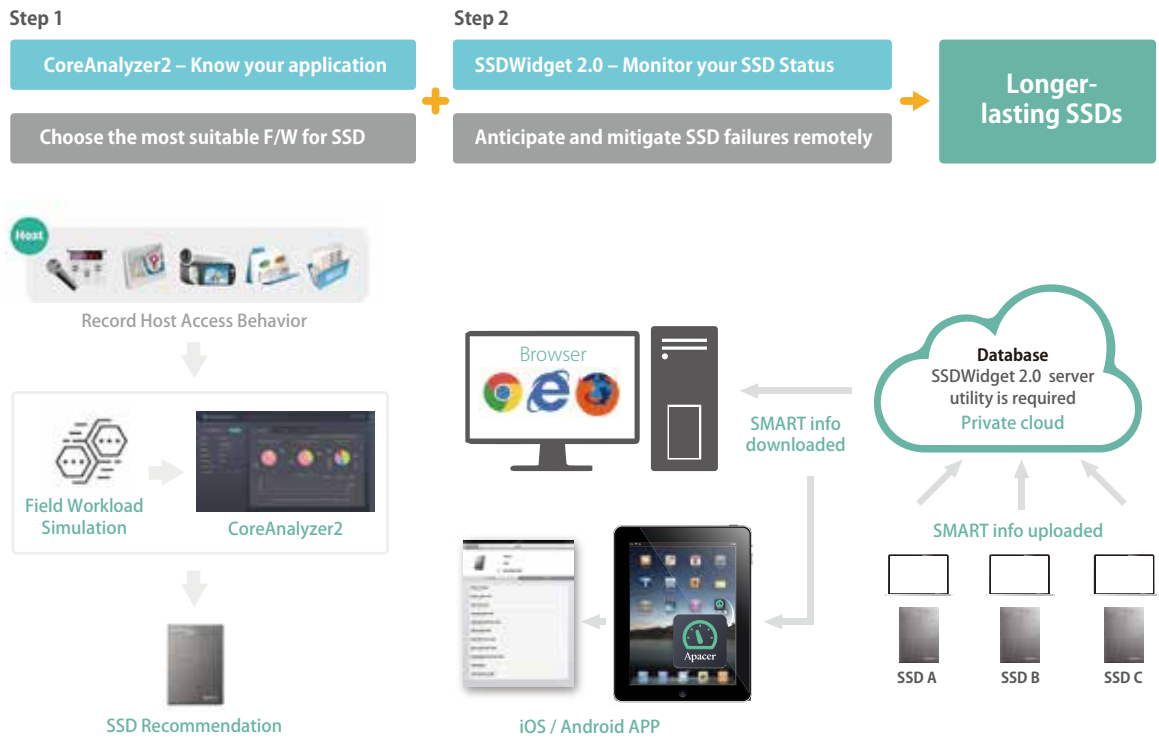
Apacer's Double-barreled Solution Cloud Edition is a solution designed to monitor the typical pain points of an IoT edge device network. DBS Cloud Edition automatically collects data related to SSD temperatures, unexpected power outages, remaining lifespan, and operating status, and instantly transmits the data to the back-end management platform. Users can then observe this data as it comes in, thanks to the intuitive dashboard interface.

### Advantages:

- Seamless integration with existing RDM platforms
- Alerts can be sent to administrators via eMail, SMS, or apps such as WhatsApp, Line or Wechat
- Anticipating the end of an SSD's lifespan means flawless data integrity
- Unexpected power cycling can be tracked easily
- OS recovery and firmware updating over the air
- Reduces maintenance costs and downtime
- Combats industrial pain points such as reputation damage, security vulnerabilities, and business losses







## Existing Integrated Remote Device Management Systems

Apacer has also collaborated with Advantech and Allxon to develop the DBS Cloud Edition. It offers customers greater choice in deploying and remote device management system and adds flexibility while retaining seamless integration to significantly reduce customer deployment time and costs.



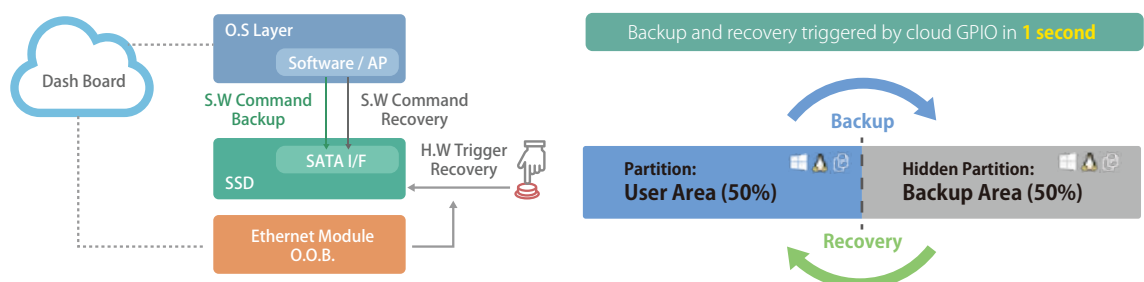
## CoreSnapshot

Recover an SSD's data and OS in just one second

Full backup and recovery of SSD data can be performed in one second, which can instantly eliminate catastrophic system issues and prevent data damage or downtime translating into operational risks and losses.

### CoreSnapshot Operation Flow

Backup & Recovery via SSD



## Data Integrity



### DataRAID™

Using this algorithm, a certain amount of space is given over to aggregating and resaving the existing parity data used for error checking. So, in the event that data becomes corrupted, the parity data can be compared to the existing uncorrupted data and the content of the corrupted data can be rebuilt.



### Data Retention

Data retention refers to how long stored data can be maintained while a storage device is powered down. Apacer offers a number of optimization strategies to help customers achieve the ideal balance of data retention with P/E cycles for industrial applications.



### End-to-end Data Protection

This technology ensures that whenever data moves from the host to the controller or from the controller to DRAM or NAND flash, error checking is applied. In some cases, error correction will also be part of the circuit.



### Smart Read Refresh™

Apacer's Smart Read Refresh™ helps avoid read disturb errors from occurring. It ensures that during read operations, when the read operation threshold is reached, the data is refreshed by re-writing it to a different block for future use.

## Longevity



### CoreAnalyzer2

CoreAnalyzer2 is an exclusive, analytic data-behavior technology implemented on our SSD products. Featuring collecting and analyzing data of customers' host system, it can help our customers analyze their usage behavior so they can choose the best-suited.



### Over-provisioning

Apacer's SSDs support over-provisioning, which sets aside a certain portion of the physical capacity of the memory to carry out garbage collection, wear-leveling and bad block management. The result is a longer operating lifetime.



### CoreLife

This extends the service life of SSDs up to eight times, through its firmware optimized for gaming and health-care applications that often require small random writes to storage.



### Page Mapping

This is an advanced flash management technology and can increase random access speeds, extend SSD lifespans, reduce block erase frequency, and achieve optimal performance.



SLC  
liteX

## SLC-liteX

Apacer's 3D NAND SLC-liteX technology breaks through the limitations of existing technology and provides up to 30,000 P/E cycles, which is 10 times more than MLC or industrial 3D TLC.



## SSDWidget 2.0

Apacer SSDWidget 2.0 is a comprehensive disk monitoring and maintaining utility. Designed with the concepts of S.M.A.R.T., SSDWidget2.0 can monitor SSD's health-related information and provide SSD status for SSD lifetime monitoring and workload analysis.



## S.M.A.R.T.

S.M.A.R.T. is a self-monitoring system that provides indicators of drive health as well as potential disk problems. It serves as a warning for users from unscheduled downtime by monitoring and displaying critical drive information.

# Power Stability



## CorePower

This is a hardware-based technology designed to prevent data loss and ensure the stability of data transmission during a power outage using a backup power supply to allow sufficient time to move all cached data to NAND flash.



## DEVSLP

Device Sleep is a feature that allows SATA devices to enter a low power mode by designating pin P3 as DEVSLP signal with an aim to reducing power consumption.



## CoreVolt

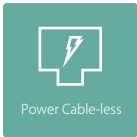
When instant voltage instability occurs, Apacer's proprietary CoreVolt technology with special hardware circuit design can prevent SSD's operating voltage from being effected by input power changes, and further enhance data protection.



## Multi-PowerPath

Apacer's Multi-PowerPath technology not only meets the input requirements for power sources of multiple platforms, but also implements an exclusive, innovative power circuit mechanism which protects miniature SSD from being damaged by overheating even when power is concurrently supplied via the three methods.





## Power Cable-less

Power cable-less is a simplified, innovative design that provides a patented 7-pin SATA connector equipped with a built-in power circuit design to replace an external power cable, thus eliminating the concern over sudden disconnection of power cords.

## Security



### ATA Secure Erase

When this command is given, an SSD will reset all its storage cells to empty, releasing trapped electrons and restoring the drive to its original state. This operation completely wipes data from the drive.



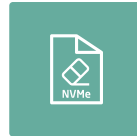
### Instant Keychange™

This function is based on AES encryption, and it can be triggered either via hardware or software. The encrypted data can never be accessed once the original key is destroyed. And destroying the original key and creating a new one takes less than a second – much faster than traditional forms of drive erasure.



### CoreDestroyer

This functionality is a hardware/software function that renders the entire SSD unusable. This option is chosen in cases where the SSD is about to fall into the hands of a bad actor.



### NVMe Secure Erase

When this command is given, NVMe Secure Erase can securely wipe out the user data in the drive and protects it from malicious attack.



### CoreEraser

CoreEraser's functionality is divided into three levels: Quick Erase, Full Erase and MIL Erase. The first option is most useful when speed is the most important factor. Full Erase is more thorough, although also more time consuming, and MIL Erase offers overwriting features that ensure data is deeply and thoroughly scrubbed from the drive.



### Signed Firmware

Apacer's Signed Firmware technology is a secure way to update firmware. By including a digital signature, a firmware update will be authenticated by the Apacer SSD before a firmware update is performed. This extra layer of protection keeps drives secure.



## TCG Opal 2.0

Apacer offers TCG Opal 2.0-compliant self-encrypting drives (SEDs) which incorporate AES encryption for rock-solid data protection. Buyers love TCG Opal 2.0's Instant Keychange™ technology, which uses cryptographic erasure to scramble a drive in less than a second. This technology is also available independently upon request.



## Write Protect

Write protect can prevent drives from unauthorized data writing via a hardware switch/pin or vendor software command.



## Opaque

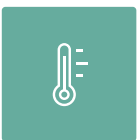
Apacer has developed the Opaque software as a custom implementation of the TCG Opal 2.0 standard. Its accessible interface allows users to control useful security functions, such as pre-boot authorization and drive revert.



## Bidirectional Security Identification

A security verification mechanism is implanted between the device and the platform to prevent the data in the device from being stolen if it is subjected to a hacker's invasion.

# Survivability



## Thermal Sensor

Thermal sensor monitors the temperature of SSD devices via S.M.A.R.T. commands. When a device's operating temperature becomes too high, a thermal sensor will notice and a signal will be sent to reduce operating speed until the temperature declines to a safe level.



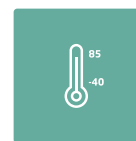
## Underfill

Underfill technique is used under the BGA to strengthen solder joints, and reinforce the product's resistance against vibration and thermal shock



## Thermal Cycling

This protection technology prevents damage to components when wild temperature swings take place. Apacer's in-house testing facility can check to ensure thermal cycling resistance and modify a standard product if needed.



## Wide Temperature

Products rated for wide temperature operation are designed with wide temperature support to ensure reliable operation in extreme temperatures ranging from -40°C to 85°C.



## Thermal Throttling

Thermal throttling mechanism dynamically adjusts frequency scaling to enhance data reliability and provides sustained performance while overheating.



## 30µ Gold Finger

With the 30µ gold plating, the connector interface is more reliable and can withstand the potential damages in industrial applications.



## Sidefill

Apacer's Sidefill technology strengthens the connections between solder joints and their board, making them more robust and vibration-resistant. It also allows for heat dissipation to offset thermal damage.



## ESD Protection

Excellent electrostatic protection which has passed the IEC 61000-4-2: air discharge ±15KV and contact discharge ±8KV. Provides protection for electromagnetic susceptibility (EMS) that meets the medical equipment standard EN60601-1-2.



### Conformal Coating



### Nano Coating

<b>Protection</b>	<b>Dust, moisture, solvent, chemicals, fungus and corrosion</b>	
<b>Main material used</b>	Acrylic	Parylene
<b>Thickness</b>	0.03 ~ 0.13 mm	0.01 ~ 0.05 mm
<b>Advantages</b>	<ul style="list-style-type: none"> <li>· <b>Simple application and drying process</b></li> <li>· Can be detected under UV illumination</li> <li>· Compliant with the <b>IP53 rating</b> and <b>MIL-STD-810G</b></li> </ul>	<ul style="list-style-type: none"> <li>· Produces a highly <b>thin, dense and scratch-resistant film</b> with no pinholes</li> <li>· Compliant with the <b>IP57 rating</b></li> <li>· Invisible to human eyes</li> </ul>
<b>Cost</b>	\$	\$\$\$
<b>Applications</b>	<b>Industrial applications</b> that run in harsh environments	<b>High-end applications</b> such as defense, aerospace, automotive and healthcare
<b>Applicable products</b>	<b>Module type w/o housing *</b>	





# Applications



## Transportation

Engage with Intelligent Transportation System,  
Exploit the Internet of Vehicles




## Server & Networking

Expand the Boundaries Beyond Limits




## Gaming

Protect Your Data with Our Security Solutions



## Internet of Things

Grow the Ecosystem of IoT Devices



## Healthcare

Security, Safety and Reliability



## Defense

Extremely Rugged Design and  
Incomparable Reliability



## Factory Automation

The Cutting Edge of Remote Device Management

# PCIe SSD

- Superb performance and low latency
- Compliant with the NVMe™ specification
- Transmission speed up to 3,200 MB/sec
- Thermal Throttling support
- End-to-end data protection support



Model	PV220-M280	PV210-M280	PT910-uSSD
<b>Form Factor</b>	M2.2280	M2.2280	PCIe BGA SSD (M.2 1113)
<b>Interface</b>	PCIe Gen3 x4	PCIe Gen3 x4	PCIe Gen3 x2
<b>Connector</b>	M.2 M key	M.2 M key	-
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC
<b>Capacity</b>	120GB-1920GB	240GB-1920GB	30GB~240GB
<b>External DRAM</b>	-	YES	- (w/ HMB FW)
<b>Max. R/W Performance (MB/sec)</b>	1695/1685	3130/2630	890/745
<b>Standard Operating Temperature (°C)</b>	0~ +70	0~ +70	0~70
<b>Wide Temperature (°C)</b>	-40~+85	-40~+85	-
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)		
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)		
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000
<b>Dimension (mm)</b>	Single side: 80.00 x 22.00 x 2.38 Double side: 80.00 x 22.00 x 3.88 CoreGlacier: 80.00 X 22.00 X 4.08	Double side: 80.00 x 22.00 x 3.88 CoreGlacier: 80.00 X 22.00 X 4.08	11.50 x 13.00 x 1.40

# PCIe SSD



Model	PT220-M280	PV910-CFX	PV140-25
<b>Form Factor</b>	M.2 2280	CFexpress 1.0 Type B	2.5"
<b>Interface</b>	PCIe Gen3 x2	PCIe Gen3 x2	PCIe Gen3 x4
<b>Connector</b>	-	-	U.2 (SFF-8639)
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC
<b>Capacity</b>	128GB~1TB	60GB~480GB	960 ~ 3840GB
<b>External DRAM</b>	-	-	Yes
<b>Max. R/W Performance (MB/sec)</b>	2240/1780	1775/1270	3340/1175
<b>Standard Operating Temperature ( °C)</b>	0 ~ + 70	0 ~ + 70	-
<b>Wide Temperature ( °C)</b>	-	-40 ~ + 85	-40 ~ + 85
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)		Non-operation: 1,500(G), half sine wave
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)		Non-operation: 20G, 20~2000 Hz/random
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000
<b>Dimension (mm)</b>	Single side: 80.00 x 22.00 x 2.38 Double side: 80.00 x 22.00 x 3.88	29.60 x 38.50 x 3.80	7mm: 100.00 x 69.85 x 7.00

\*All product specifications are subject to change without notice.



# SATA 2.5" SSD

- Perfect replacement for 2.5" SATA HDDs
- Supports LDPC ECC
- Global wear-leveling technology
- Flash Bad-block Management
- S.M.A.R.T. and SSDWidget support
- Power Failure Management



Model	SV240-25	SV250-25	ST250-25	SV170-25
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.0 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	(7+15) pin male	(7+15) pin male	(7+15) pin male	(7+15) pin male
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC	3D TLC
<b>Capacity</b>	120GB~3.8TB	30GB~960GB	64-1TB	60GB~960GB
<b>Max. R/W Performance (MB/sec)</b>	560/505	560/520	560/520	560/510
<b>IOPs (4K Random Write)</b>	86K	73K	73K	75K
<b>Standard Operating Temperature ( °C )</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature ( °C )</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature ( °C )</b>	-55 ~ + 100	-55 ~ + 100	-55 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)			
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)			
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>3,000,000
<b>Dimension (mm )</b>	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30	7mm:100.00 x 69.85 x 6.90	7mm:100.00 x 69.85 x 6.90

# SATA 2.5" SSD



Model	SM210-25 SM21P-25	SM130-25	SU210-25	SS210-25
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	(7+15) pin male	(7+15) pin male	(7+15) pin male	(7+15) pin male
<b>NAND Flash Type</b>	MLC	MLC	MLC	SLC
<b>Capacity</b>	32GB~512GB	512GB~2TB	16GB~256GB	8GB~240GB
<b>Max. R/W Performance (MB/sec)</b>	510/470 545/475	560/535	505/390	530/445
<b>IOPs (4K Random Write)</b>	79K	89K	80K	76K
<b>Standard Operating Temperature ( °C )</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature ( °C )</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature ( °C )</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)			
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)			
<b>MTBF (hours)</b>	>1,000,000	>3,000,000	>1,000,000	>2,000,000
<b>Dimension (mm )</b>	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30	7mm:100.00 x 69.85 x 6.90 9.5mm: 100.00 x 69.85 x 9.30

\*All product specifications are subject to change without notice.

# SATA M.2

- M.2 (NGFF) Connector
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- TRIM support
- Thermal Throttling (optional)



Model	SV250-M242	ST250-M242	SM230-M242	SS220-M242
<b>Form Factor</b>	M.2 2242	M.2 2242	M.2 2242	M.2 2242
<b>Interface</b>	SATA 3.2 (6Gb/s)	M.2 2242-D5-B-M	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	M.2 B & M key	75-pin SATA-based M.2 module pinout	M.2 B & M key	M.2 B & M key
<b>NAND Flash Type</b>	3D TLC	3D TLC	MLC	SLC
<b>Capacity</b>	30GB~960GB	64-512GB	8GB~256GB	1GB~64GB
<b>External DRAM</b>	-	-	-	Yes
<b>Max. R/W Performance (MB/sec)</b>	560/515	560/520	555/470	555/450
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-55 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)			
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)			
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>1,000,000	>2,000,000
<b>Dimension (mm)</b>	42.00 x 22.00 x 3.80	42.00 x 22.00 x 3.80	42.00 x 22.00 x 3.80	42.00 x 22.00 x 3.60



# SATA M.2



Model	SV240-M280	SV250-M280	ST250-M280	SM230-M280	SM210-M280
<b>Form Factor</b>	M.2 2280	M.2 2280	M.2 2280-D5-B-M	M.2 2280	M.2 2280
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.0 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	M.2 B & M key	M.2 B & M key	75-pin SATA-based M.2 module pinout	M.2 B & M key	M.2 B & M key
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC	MLC	MLC
<b>Capacity</b>	120GB~1920GB	30-960GB	64-1TB	32GB ~ 1TB	32GB~512GB
<b>External DRAM</b>	Yes	-	-	-	Yes
<b>Max. R/W Performance (MB/sec)</b>	560/515	560/520	560/520	560/510	540/485
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-55 ~ + 100	-55 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)				
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)				
<b>MTBF (hours)</b>	3,000,000	>3,000,000	>3,000,000	>1,000,000	>1,000,000
<b>Dimension (mm)</b>	80.00 x 22.00 x 3.88	Single side: 80.00 x 22.00 x 2.38 Double side: 80.00 x 22.00 x 3.88	Single side: 80.00 x 22.00 x 2.23 Double side: 80.00 x 22.00 x 3.58	Single side: 80.00 x 22.00 x 2.23 Double side: 80.00 x 22.00 x 3.58	Single side: 80.00 x 22.00 x 2.23 Double side: 80.00 x 22.00 x 3.58

\*All product specifications are subject to change without notice.

# SATA MO-276 / MO-297/ MO-300

- Compliant with JEDEC MO-276 / MO-297 / MO-300 standard
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- TRIM support
- DEVSLP support (optional)



Model	SV170-μSSD	SV170-297	SV240-297
<b>Form Factor</b>	JEDEC MO-276	JEDEC MO-297	JEDEC MO-297
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	BGA 156 Ball	(7+15) pin male	(7+15) pin male
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC
<b>Capacity</b>	30GB~120GB	30GB~480GB	120GB~960GB
<b>External DRAM</b>	-	-	Yes
<b>Max. R/W Performance (MB/sec)</b>	560/460	560/500	560/510
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-40 ~ + 100	-40 ~ + 100	-55 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)		
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)		
<b>Dimension (mm)</b>	16.00 x 20.00 x 1.40	54.00 x 39.80 x 4.00	54.00 x 39.80 x 4.00
<b>MTBF (hours)</b>	>1,000,000	>3,000,000	>3,000,000

# SATA MO-276 / MO-297/ MO-300



Model	SV240-300	SV250-300	SV170-300	SS210-300
<b>Form Factor</b>	JEDEC MO-300	JEDEC MO-300	JEDEC MO-300	JEDEC MO-300
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	52 pin male	52 pin male	52 pin male	52 pin male
<b>NAND Flash Type</b>	3D TLC	3D TLC	3D TLC	SLC
<b>Capacity</b>	120GB~1920GB	30GB~480GB	30GB~960GB	2GB~128GB
<b>External DRAM</b>	Yes	-	-	Yes
<b>Max. R/W Performance (MB/sec)</b>	560/510	560/515	560/500	525/445
<b>Standard Operating Temperature ( °C )</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature ( °C )</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature ( °C )</b>	-55 ~ + 100	-55 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)			
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)			
<b>Dimension (mm)</b>	50.80 x 29.85 x 4.85	50.80 x 29.85 x 4.85	50.80 x 29.85 x 3.80	50.80 x 29.85 x 3.80
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>2,000,000

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# SATA 7-pin Module

- 7-pin SATA connector
- Write protect by hardware switch (optional)
- TRIM command support
- Built-in ATA secure erase and S.M.A.R.T. functions
- Global wear-leveling and block management
- Unique hook design
- Thermal Throttling (optional)



Model	SV250-7LP2/180D	SDM7-M 7P/180D DP	SDM7-M 7P 180D LP2(H)	SDM5A-M 7P/180D LP(H)	SDM5A-M 7P/90D LP(H)	SDM5A-M 7P/180D LP5(H)
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)
<b>Connector</b>	7-pin	7-pin	7-pin	7-pin	7-pin	7-pin
<b>NAND Flash Type</b>	3D TLC	MLC	MLC	MLC	MLC	MLC
<b>Capacity</b>	60GB~240GB	32GB ~ 256GB	8GB ~ 64GB	4GB~64GB	4GB~32GB	16GB ~ 64GB
<b>Max. R/W Performance (MB/sec)</b>	560/510	525/355	135/90	425/80	120/40	425/80
<b>Standard Operating Temperature ( °C )</b>	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70
<b>Wide Temperature ( °C )</b>	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85
<b>Storage Temperature ( °C )</b>	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100
<b>Housing</b>	-	-	Optional	Optional	Optional	Optional
<b>H/W Write Protect</b>	Optional	Optional	Optional	-	-	Optional
<b>Cable-less Solution</b>	Multi-PowerPath	Multi-PowerPath	Multi-PowerPath	Optional (7+2 pin)	Optional (7+2 pin)	Multi-PowerPath
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)					
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)					
<b>MTBF (hours)</b>	>3,000,000	>1,000,000	>1,000,000	>1,000,000	>1,000,000	>1,000,000
<b>Dimension (mm)</b>	33.00 x 29.30 x 8.85	30.00 x 32.50 x 7.80	Without housing: 33.00 x 29.30 x 8.85 With housing: 35.20 x 30.40 x 9.25	Without housing: 30.00x 27.80 x 8.20 With housing: 32.50 x 29.40 x 8.53	Without housing: 30.00 x 20.00 x 15.20 With housing: 32.50 x 23.13 x 17.80	Without housing: 33.00 x 29.30 x 88.50 With housing: 35.20 x 30.40 x 9.25



# SATA 7-pin Module



Model	SDM5A-M 7P/180D Slim2(H)	SDM5A 7P/180D Slim2(H)	SDM5A 7P/180D LP(H)	SDM5A 7P/180D LP2	SDM5A 7P/90D LP(H)
<b>Interface</b>	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)
<b>Connector</b>	7-pin	7-pin	7-pin	7-pin	7-pin
<b>NAND Flash Type</b>	MLC	SLC	SLC	SLC	SLC
<b>Capacity</b>	4GB~32GB	1GB~16GB	1GB~32GB	8GB~32GB	1GB~16GB
<b>40Max. R/W Performance (MB/sec)</b>	120/40	44/40	435/215	435/215	44/40
<b>Standard Operating Temperature ( °C )</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Wide Temperature ( °C )</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature ( °C )</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Housing</b>	Optional	Optional	Optional	-	Optional
<b>H/W Write Protect</b>	-	-	-	Optional	-
<b>Cable-less Solution</b>	Optional (7+2 pin)	Optional (7+2 pin)	Optional (7+2 pin)	Optional (7+2 pin)	Optional (7+2 pin)
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)				
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)				
<b>MTBF (hours)</b>	>1,000,000	>2,000,000	>2,000,000	>2,000,000	>2,000,000
<b>Dimension (mm )</b>	Without housing: 17.00 x 40.00 x 6.10 With housing: 19.80 x 41.40 x 7.50	Without housing: 17.00 x 40.00 x 6.10 With housing: 19.80 x 41.40 x 7.50	Without housing: 30.00 x 27.80 x 8.20 With housing: 32.50 x 29.40 x 8.53	33.00 x 29.30 x 9.05	Without housing: 30.00 x 20.00 x 15.20 With housing: 32.50 x 23.10 x 17.80

\*All product specifications are subject to change without notice.

# Industrial CF Card

- Compliant with CFA 6.0/CF 6.1 specification(CH710-CF)
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- MLC extended temperature support
- Lock switch design for write-protection (optional)
- Support page mapping (CM710-CF/CS710-CF/CH710-CF)



Model	Industrial CF6-M	Industrial CM710-CF	Industrial CF6A-M	Industrial CF6	Industrial CS710-CF	Industrial CF6A	Industrial CH710-CF
<b>Interface</b>	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode	PC Card Memory Mode; PC Card I/O Mode; True IDE Mode
<b>Connector</b>	50-pin	50-pin	50-pin	50-pin	50-pin	50-pin	50-pin
<b>Transfer Mode</b>	PIO Mode-6, MWDMA Mode-4, UDMA Mode-7	PIO Mode-6, MWDMA Mode-4, UDMA Mode-6	PIO Mode-6, MWDMA Mode-4, UDMA Mode-7	PIO Mode-6, MWDMA Mode-4, UDMA Mode-7	PIO Mode-6, MWDMA Mode-4, UDMA Mode-6	PIO Mode-6, MWDMA Mode-4, UDMA Mode-7	PIO Mode-6, MWDMA Mode-4, UDMA Mode-6
<b>NAND Flash Type</b>	MLC	MLC	MLC	SLC	SLC	SLC	SLC-liteX
<b>Capacity</b>	8GB~128GB	8GB~128GB	8GB~64GB	512MB~64GB	128MB~64GB	256MB~32GB	8GB~64GB
<b>Max. R/W Performance (MB/sec)</b>	110/65	90/55	115/75	110/80	55/55	60/65	115/80
<b>Standard Operating Temperature (°C)</b>	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70
<b>Wide Temperature (°C)</b>	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85
<b>Storage Temperature (°C)</b>	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100
<b>H/W Write Protect</b>	Optional	-	Optional	Optional	-	Optional	-
<b>Shock</b>	Operation: 50G/11 ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)						
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G) *Non-operation: 15 G, 10 ~ 2000 Hz/sine_for CF6 and CF6-M only						
<b>MTBF (hours)</b>	>1,000,000	>3,000,000	>1,000,000	>2,000,000	>3,000,000	>2,000,000	>3,000,000
<b>Dimension (mm)</b>	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30	36.40 x 42.80 x 3.30

# Industrial CFast Card

- Compliant with CFast 2.0 specification
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- TRIM support
- DEVSLP Support
- Thermal Throttling (optional)



Model	SV250-CFast	SM22P-CFast	SU220-CFast	SM230-CFast	SU230-CFast	SS220-CFast	SH250-CFast
<b>Interface</b>	SATA 3.2 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.2 (6Gb/s)	SATA 3.1 (6Gb/s)	SATA 3.2 (6Gb/s)
<b>Connector</b>	(7+17) pin male (7+17) pin male (7+17) pin male (7+17) pin male (7+17) pin male (7+17) pin male (7+17) pin male						
<b>Form Factor</b>	CFast	CFast	CFast	CFast	CFast	CFast	CFast
<b>NAND Flash Type</b>	3D TLC	MLC	MLC	MLC	MLC	SLC	3D TLC
<b>SLC-lite</b>	-	-	Yes	-	Yes	-	Yes
<b>Capacity</b>	30GB~480GB	8GB~128GB	8GB~128GB	8GB~256GB	8GB~128GB	8GB~64GB	10GB-160GB
<b>External DRAM</b>	-	Yes	Yes	-	-	Yes	-
<b>Max. R/W Performance (MB/sec)</b>	560/515	475/85	535/480	560/465	555/475	520/455	560/515
<b>Standard Operating Temperature (°C)</b>	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70	0 ~ +70
<b>Storage Temperature (°C)</b>	-55 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-40 ~ +100	-55 ~ +100
<b>H/W Write Protect</b>	Optional	-	Optional	Optional	Optional	Optional	Optional
<b>Shock</b>	Operation: 50G/11ms (compliant with MIL-STD-202G) Non-operation: 1500G/0.5ms (compliant with MIL-STD-883K)						
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 15 Grms, 10 ~ 2000 Hz/sine (compliant with MIL-STD-810G)						
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>1,000,000	>1,000,000	>3,000,000	>3,000,000
<b>Dimension (mm)</b>	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60	36.40 x 42.80 x 3.60

\*All product specifications are subject to change without notice.

# Industrial SD Card

- Compliant with SD 3.0 and 2.0 specification
- S.M.A.R.T supported
- Global wear-leveling and block management
- Supports class 10 with UHS-I
- Auto standby and sleep mode support
- Low power consumption
- Page mapping (R1 Only)



Model	CV110-SD	CH110-SD	Industrial SD H1-SL	Industrial SD H1-M	Industrial SD	IndustrialSD R1
<b>Interface</b>	SD4.0	SD4.0	SD3.0	SD3.0	SD2.0	SD3.0
<b>NAND Flash Type</b>	3D TLC	3D TLC	MLC	MLC	SLC	SLC
<b>SLC-lite</b>	-	Yes	Yes	-	-	-
<b>Capacity</b>	32GB~256GB	8GB~64GB	SDHC:4GB~64GB	SDHC: 4GB~128GB	SD:256MB~2GB; SDHC:4GB~32GB	SD:1GB~2GB; SDHC:4GB~16GB
<b>Max. R/W Performance (MB/sec)</b>	90/34	95/80	43/40	43/30	23/17	43/41
<b>Standard Operating Temperature (°C)</b>	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85	0 ~ + 70	-25 ~ + 85
<b>Wide Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-40 ~ + 100	-40 ~ + 85	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>H/W Write Protect</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)					
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)					
<b>Dimension (mm)</b>	32.00 x 24.00 x 2.10	32.00 x 24.00 x 2.10	32.00 x 24.00 x 2.10	32.00 x 24.00 x 2.10	24.00 x 32.00 x 2.10	32.00 x 24.00 x 2.10
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>3,000,000	>1,500,000	>3,000,000



# Industrial microSD Card

- Compliant with SD 3.0 and SD2.0 specification
- S.M.A.R.T supported
- Supports SD mode and SPI mode
- Global wear-leveling and block management
- Low power consumption
- Page mapping (R1 Only)
- Supports Extended Temperature



Model	CV110-MSD	CH110-MSD	Industrial microSD H1-SL	Industrial microSD H1-M	Industrial microSD	Industrial microSD R1
<b>Interface</b>	SD5.0	SD5.0	SD3.0	SD3.0	SD2.0	SD3.0
<b>NAND Flash Type</b>	3D TLC	3D TLC	MLC	MLC	SLC	SLC
<b>SLC-lite</b>	-	Yes	Yes	-	-	-
<b>Capacity</b>	32GB~256GB	8GB~64GB	4GB~32GB	4GB~128GB	SD:256MB~2GB; SDHC:4GB	SD:1GB~2GB; SDHC:4GB~8GB
<b>Max. R/W Performance (MB/sec)</b>	90/34	95/80	43/40	75/65	20/16	34/28
<b>Standard Operating Temperature (°C)</b>	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85	-25 ~ + 85
<b>Extended Operating Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)					
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)					
<b>Dimension (mm)</b>	15.00 x 11.00 x 1.00	15.00 x 11.00 x 1.00	15.00 x 11.00 x 1.00	15.00 x 11.00 x 1.00	15.00 x 11.00 x 1.00	15.00 x 11.00 x 1.00
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>3,000,000	>2,000,000	>3,000,000

\*All product specifications are subject to change without notice.

# Industrial USB Drive

- ECC engine
- Power Saving implemented
- Implements advanced wear-leveling algorithms
- Optional Industrial temp. range -40°C to 85°C
- Chip-On-Board (COB) packaging technology, stored and protected against dust, water and shock (EH163-M/ UT110-UFD2)
- Support page mapping (UV110-UFD1/ UH110-UFD4/ UT110-UFD2)
- Lock switch design for write-protection (UH110-UFD4 only)



Model	EH163-M	EH353-M	EH353	AH321	AH322
<b>Interface</b>	USB3.0	USB3.0	USB3.0	USB2.0	USB2.0
<b>Connector</b>	USB3.0 A Type Plug	USB3.0 A Type Plug	USB3.0 A Type Plug	USB2.0 A Type Plug	USB2.0 A Type Plug
<b>NAND Flash Type</b>	MLC	MLC	SLC	SLC	SLC
<b>Capacity</b>	8GB~64GB	8GB~128GB	256MB~32GB	256MB~32GB	256MB~32GB
<b>Max. R/W Performance (MB/sec)</b>	225/80	205/95	80/70	34/22	34/22
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Extended Operating Temperature (°C)</b>	-	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-25 ~ + 85	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)				
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G) (Non-operation: 15 G, 10 ~ 2000 Hz/sine for AH321/ AH322 only)				
<b>Dimension (mm)</b>	23.10 x 14.25 x 6.90	59.00 x 18.40 x 9.10	59.00 x 18.40 x 9.10	60.59 x 19.00 x 8.00	55.29 x 18.00 x 8.50
<b>MTBF (hours)</b>	>1,000,000	>3,000,000	>3,000,000	>3,000,000	>3,000,000

# Industrial USB Drive



Model	USZ20-UFD5	US120-UFD5	UM120-UFD5	UV110-UFD1	UT110-UFD2	UH110-UFD4
<b>Interface</b>	USB 2.0	USB 3.0	USB 3.0	USB 3.1 gen 1	USB 3.1 gen 1	USB 3.1 gen 1
<b>Connector</b>	USB2.0 A Type Plug	USB3.0 A Type Plug	USB3.0 A Type Plug	USB3.1 gen 1 A Type Plug	USB3.1 gen 1 A Type Plug	USB3.1 gen 1 A Type Plug
<b>NAND Flash Type</b>	SLC	SLC	MLC	TLC	TLC	SLC-liteX
<b>Capacity</b>	256MB~32GB	256MB~32GB	8GB~128GB	16GB~256GB	32GB~64GB	4GB~8GB
<b>Max. R/W Performance (MB/sec)</b>	34/22	80/70	205/95	260/125	250/100	265/50
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Extended Operating Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85 16GB not support	-40 ~ + 85	-40 ~ + 85 4GB not support
<b>Storage Temperature (°C)</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-55 ~ + 100	-40 ~ + 100	-55 ~ + 100
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)					
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)					
<b>Dimension (mm)</b>	56.05x18.0x8.50	56.05x18.00x8.50	56.05x18.00x8.50	46.85x17.20x7.70	23.10x14.25x6.90	51.15x17.20x7.70
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000	>3,000,000	>1,000,000	>3,000,000

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# Industrial USB Disk Module

- Compliant with the standard USB specification
- Compact size and available in various form factors
- Support Linux /Win7 /Win10 or later
- Shock resistance, anti-vibration and low power consumption
- Support page mapping (UV110-UFM1/ UV110-UFM2/ UH110-UFM1)
- Lock switch design for write-protection (optional)



Model	UDM 1U-M	UDM2A-M	UDM 1U	UDM2A
<b>Interface</b>	USB 3.0	USB2.0	USB 3.0	USB2.0
<b>Connector</b>	20 pin	10 pin	20 pin	10 pin
<b>Connector Pitch (mm)</b>	2.00	90D (Type A, B, C): 2.54 LP 180D (Type D): 2.54 LP 90D (Type E): 2.00	2.00	90D (Type A, B, C): 2.54 LP 180D (Type D): 2.54 LP 90D (Type E): 2.00
<b>NAND Flash Type</b>	MLC	MLC	SLC	SLC
<b>Capacity</b>	8GB~32GB	8GB~128GB	128MB~16GB	256MB~32GB
<b>Max. R/W Performance (MB/sec)</b>	90/48	44/43	40/35	44/41
<b>Standard Operating Temperature ( °C )</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Extended Operating Temperature ( °C )</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature ( °C )</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)			
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)			
<b>MTBF (hours)</b>	>1,000,000	>1,000,000	>2,000,000	>2,000,000
<b>Dimension (mm )</b>	22.40 x 24.00 x 5.00	90D (Type A): 28.80 x 26.65 x 10.76 90D (Type B): 37.80 x 26.65 x 10.76 90D (Type C): 37.80 x 26.65 x 10.76 with housing: LP 180D (Type D): 28.10 x 35.70 x 7.20 LP 90D (Type E): 36.80 x 26.50 x 7.10	22.40 x 24.00 x 5.00	90D (Type A): 28.80 x 26.65 x 10.76 90D (Type B): 37.80 x 26.65 x 10.76 90D (Type C): 37.80 x 26.65 x 10.76 with housing: LP 180D (Type D): 28.10 x 35.70 x 7.20 LP 90D (Type E): 36.80 x 26.50 x 7.10



# Industrial USB Disk Module



Model	UV110-UFM1	UV110-UFM2	UH110-UFM1
<b>Interface</b>	USB2.0	USB2.0	USB2.0
<b>Connector</b>	10 pin	10 pin	10 pin
<b>Connector Pitch (mm)</b>	90D (Type C): 2.54	90D (Type E): 2.00	90D (Type C): 2.54
<b>NAND Flash Type</b>	TLC	TLC	SLC-liteX
<b>Capacity</b>	16GB~128GB	16GB~128GB	8GB~32GB
<b>Max. R/W Performance (MB/sec)</b>	40/33	40/33	41/25
<b>Standard Operating Temperature ( °C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Extended Operating Temperature ( °C)</b>	-40 ~ + 85 16GB not support	-40 ~ + 85 16GB not support	-40 ~ + 85
<b>Storage Temperature ( °C)</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	Operating: 50G/11ms,(compliant with MIL-STD-202G) Non-operating: 1500G/0.5ms,(compliant with MIL-STD-883K)		
<b>Vibration</b>	Operation: 7.69 Grms, 20~2000 Hz/random (compliant with MIL-STD-810G) Non-operation: 4.02 Grms, 15 ~ 2000 Hz/sine (compliant with MIL-STD-810G)		
<b>MTBF (hours)</b>	>3,000,000	>3,000,000	>3,000,000
<b>Dimension (mm )</b>	36.90 x 26.60 x 9.70	36.80 x 26.50 x 7.50	36.90 x 26.60 x 9.70

# PATA SSD/ Disk Module

- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- Master / Slave jumper setting



Model	AFD257-M	AFD257	ADM55-M	ADM55
<b>Interface</b>	PATA	PATA	PATA	PATA
<b>Connector</b>	44 pin	44 pin	40 pin/44 pin	40 pin/44 pin
<b>Product Type</b>	44P/180D	44P/180D	40P/180D 44P/90D, 180D, 270D	40P/180D 44P/90D, 180D, 270D
<b>NAND Flash Type</b>	MLC	SLC	MLC	SLC
<b>Capacity</b>	32GB~256GB	8GB~128GB	90D: 8GB~128GB 180D MPH: 8GB~64GB	90D: 128MB~64GB 180D MPH: 128MB~32GB
<b>Max. R/W Performance (MB/sec)</b>	100/90	100/95	105/100	75/65
<b>Standard Operating Temperature (°C)</b>	0 ~ + 70	0 ~ + 70	0 ~ + 70	0 ~ + 70
<b>Extended Operating Temperature (°C)</b>	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85	-40 ~ + 85
<b>Storage Temperature (°C)</b>	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100	-40 ~ + 100
<b>Shock</b>	1500G (complied with MIL-STD810)			
<b>Vibration</b>	15G (complied with MIL-STD810)			
<b>MTBF (hours)</b>	>1,000,000	>2,000,000	>1,000,000	>2,000,000
<b>Dimension (mm)</b>	100.00 x 69.80 x 9.30	100.00 x 69.80 x 9.30	44P/270D: 45.00 x 28.00 x 7.00 40P/180D: 58.99 x 27.83 x 6.25	44P/90D: 45.00 x 28.00 x 6.85 44P/180D: 49.39 x 27.10 x 6.10



## About Apacer

Apacer is a global leader in digital storage solutions, and is devoted to innovative storage technology and services. After more than 20 years in the industry, we remain dedicated to “Becoming Better Partners.” Our core values, as always, continue to revolve around reliability and innovation.

The company focuses on embedded applications for a variety of vertical markets, including military, medical, gaming, and industrial, and has become an integration expert in digital storage, innovative applications, and value-added services. Apacer is known for its advanced technologies and product quality and was ranked by Gartner as the top industrial SSD supplier for five consecutive years, from 2012 to 2016. In addition, Apacer is committed to making a positive impact on societal issues and has joined the **Responsible Business Alliance (RBA)**, which is formerly known as Electronic Industry Citizenship Coalition (EICC), a coalition promoting **corporate social responsibility (CSR)** within the global electronics supply chain. We believe that the success of a corporation is marked not by profit but by how we benefit others, whether by caring for the environment or making contributions to society.



## Compliance and Associations



ISO 9001:2015



ISO 14001:2015



OHSAS 18001:2015



IECQ CQ80000



# The Most Reliable Storage For Industries

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