

RoHS Compliant

Serial ATA Flash Drive

SV24P-25 Product Specifications
(CorePower Series)



September 29, 2021

Version 1.0



Apacer Technology Inc.

1F, No.32, Zhongcheng Rd., Tucheng Dist., New Taipei City, Taiwan, R.O.C

Tel: +886-2-2267-8000 Fax: +886-2-2267-2261

www.apacer.com

Specifications Overview:

- **Compliance with SATA Revision 3.2**
 - SATA 6 Gb/s interface
 - Backward compatible with SATA 1.5 and 3 Gb/s interfaces
 - ATA command set-4 (ACS-4)
- **Capacity**
 - 120, 240, 480, 960, 1920 GB
- **Performance***
 - Burst read/write: 600 MB/sec
 - Sequential read: Up to 560 MB/sec
 - Sequential write: Up to 495 MB/sec
 - Random read (4K): Up to 96,000 IOPS
 - Random write (4K): Up to 84,000 IOPS
- **Flash Management**
 - Low-Density Parity-Check (LDPC) Code
 - Global Wear Leveling
 - Flash bad-block management
 - Flash Translation Layer: Page Mapping
 - S.M.A.R.T.
 - ATA Secure Erase
 - Device Sleep
 - TRIM
 - Hyper Cache Technology
 - Over-Provisioning
 - DataRAID™
 - SMART Read Refresh™
- **DRAM Cache for Enhanced Random Performance**
- **Endurance (in drive writes per day: DWPD)**
 - 120 GB: 3.32 DWPD
 - 240 GB: 3.35 DWPD
 - 480 GB: 3.45 DWPD
 - 960 GB: 3.37 DWPD
 - 1920 GB: 3.56 DWPD
- **Temperature Range**
 - Operating:
 - Standard: 0°C to 70°C
 - Wide: -40°C to 85°C
 - Storage: -55°C to 100°C
- **Supply Voltage**
 - 5.0 V ± 10%
- **Power Consumption***
 - Active mode: 485 mA
 - Idle mode: 65 mA
- **Connector Type**
 - 7-pin SATA signal connector
 - 15-pin SATA power connector
- **Form Factor**
 - 2.5"
 - Dimensions: 100.00 x 69.85 x 6.90, unit: mm
 - Net Weight: 69.38g ± 5%
- **NAND Flash Type: 3D TLC (BiCS3)**
- **MTBF: >3,000,000 hours**
- **SATA Power Management Modes**
- **Security**
 - AES 256-bit hardware encryption
- **Reliability**
 - Thermal Sensor
 - End-to-End Data Protection
- **RoHS Compliant**
- **Apacer CorePower** – Implementation of Tantalum Capacitors to serve as backup power supply, capable of withstanding extended ambient temperature

*Varies from capacities. The values for performances and power consumptions presented are typical and may vary depending on flash configurations or platform settings. The term idle refers to the standby state of the device.

Table of Contents

| | |
|---|-----------|
| 1. General Descriptions | 4 |
| 2. Functional Block | 4 |
| 3. Pin Assignments..... | 5 |
| 4. Product Specifications..... | 7 |
| 4.1 Capacity..... | 7 |
| 4.2 Performance | 7 |
| 4.3 Environmental..... | 7 |
| 4.4 Mean Time Between Failures (MTBF) | 8 |
| 4.5 Certification and Compliance..... | 8 |
| 4.6 Endurance | 8 |
| 5. Flash Management | 9 |
| 5.1 Error Correction/Detection..... | 9 |
| 5.2 Bad Block Management | 9 |
| 5.3 Global Wear Leveling | 9 |
| 5.4 Flash Translation Layer – Page Mapping..... | 9 |
| 5.5 ATA Secure Erase..... | 9 |
| 5.6 TRIM..... | 10 |
| 5.7 SATA Power Management..... | 10 |
| 5.8 Device Sleep (DevSleep or DEVSLP) Mode..... | 10 |
| 5.9 Hyper Cache Technology | 11 |
| 5.10 Over-Provisioning | 11 |
| 5.11 DataRAID™ | 11 |
| 5.12 SMART Read Refresh™ | 11 |
| 6. Security and Reliability Features | 12 |
| 6.1 Advanced Encryption Standard..... | 12 |
| 6.2 Thermal Sensor | 12 |
| 6.3 End-to-End Data Protection..... | 12 |
| 7. Software Interface | 13 |
| 7.1 Command Set..... | 13 |
| 7.2 S.M.A.R.T. | 14 |
| 8. Electrical Specifications..... | 16 |

| | |
|--|-----------|
| 8.1 Operating Voltage..... | 16 |
| 8.2 Power Consumption | 16 |
| 8.3 Apacer CorePower | 16 |
| 9. Physical Characteristics..... | 17 |
| 9.1 Dimensions | 17 |
| 9.2 Net Weight..... | 17 |
| 10. Product Ordering Information..... | 18 |
| 10.1 Product Code Designations..... | 18 |
| 10.2 Valid Combinations..... | 19 |

1. General Descriptions

Apacer's SV24P-25 is a well-balanced solid-state disk (SSD) drive with standard form factor and great performance. Designed in SATA 6 Gb/s interface, the SSD is able to deliver exceptional read/write speed, making it the ideal companion for heavy-loading industrial or server operations.

SV24P-25 utilizes 3D NAND for higher capacity up to 1,920GB and provides more power efficiency than 2D NAND. Regarding reliability, SV24P-25 is implemented with LDPC (Low Density Parity Check) ECC engine to extend SSD endurance and increase data reliability. In addition, the drive comes with various implementations including powerful hardware ECC engine, power saving modes, wear leveling, flash block management, S.M.A.R.T. and TRIM.

In terms of security, Advanced Encryption Standard (AES) ensures data security and provides users with a peace of mind knowing their data is safeguarded. Furthermore, with End-to-End Data Protection, data integrity can be assured at multiple points in the path to enable reliable delivery of data transfers.

2. Functional Block

Apacer SV24P-25 includes a single-chip SATA 6 Gb/s and the flash media. The controller integrates the flash management unit to support multi-channel, multi-bank flash arrays. Figure 2-1 shows the functional block diagram.

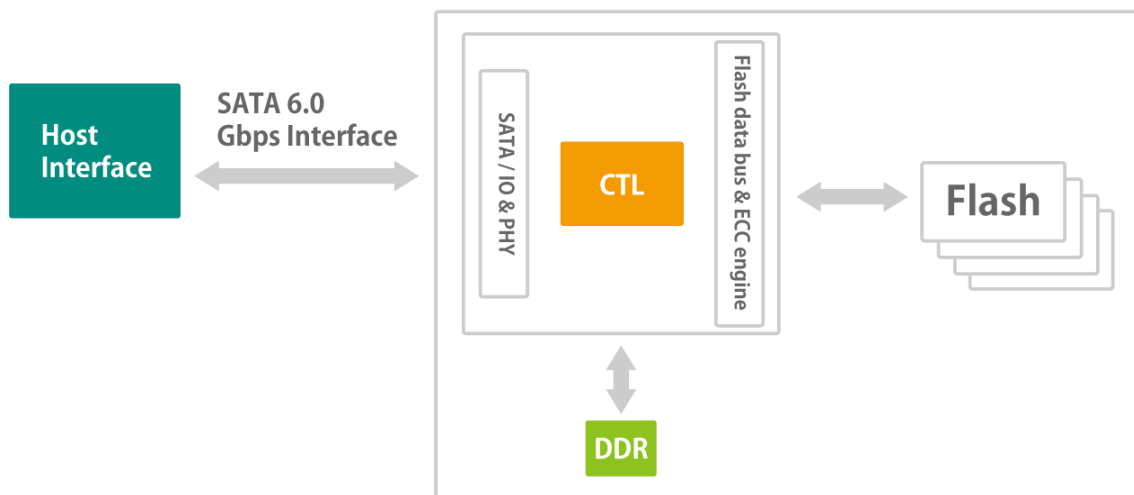


Figure 2-1 Functional Block Diagram

3. Pin Assignments

Table 3-1 describes the SFD signal segment, and Table 3-2, power segment.

Figure 3-1 SATA Connectors

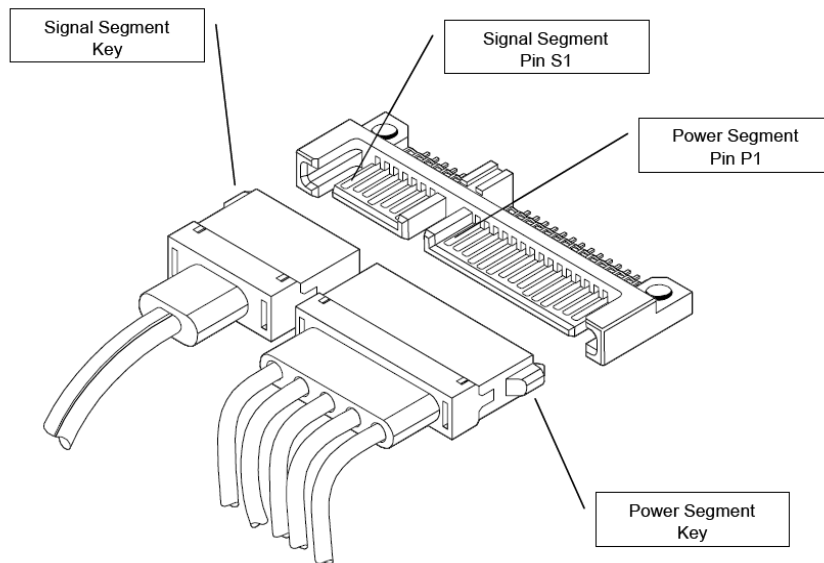


Table 3-1 Signal Segment

| Pin | Type | Description |
|-----|------|--------------------------------|
| S1 | GND | |
| S2 | RxP | + Differential Receive Signal |
| S3 | RxN | - Differential Receive Signal |
| S4 | GND | |
| S5 | TxN | - Differential Transmit Signal |
| S6 | TxP | + Differential Transmit Signal |
| S7 | GND | |

Table 3-2 Power Segment

| Pin | Signal/Description |
|-----|--------------------|
| P1 | Unused (3.3V) |
| P2 | Unused (3.3V) |
| P3 | Device Sleep |
| P4 | Ground |
| P5 | Ground |
| P6 | Ground |
| P7 | 5V |
| P8 | 5V |
| P9 | 5V |
| P10 | Ground |
| P11 | DAS |
| P12 | Ground |
| P13 | Unused (12V) |
| P14 | Unused (12V) |
| P15 | Unused (12V) |



Figure 3-2 SATA Cable/Connector Connection Diagram

The connector on the left represents the Host with TX/RX differential pairs connected to a cable. The connector on the right shows the Device with TX/RX differential pairs also connected to the cable. Notice also the ground path connecting the shielding of the cable to the Cable Receptacle.

4. Product Specifications

4.1 Capacity

Capacity specifications of SV24P-25 are available as shown in Table 4-1. It lists the specific capacity and the default numbers of heads, sectors and cylinders for each product line.

Table 4-1 Capacity Specifications

| Capacity | Total bytes* | Cylinders | Heads | Sectors | Total LBA |
|----------|-------------------|-----------|-------|---------|---------------|
| 120 GB | 120,034,123,776 | 16,383 | 16 | 63 | 234,441,648 |
| 240 GB | 240,057,409,536 | 16,383 | 16 | 63 | 468,862,128 |
| 480 GB | 480,103,981,056 | 16,383 | 16 | 63 | 937,703,088 |
| 960 GB | 960,197,124,096 | 16,383 | 16 | 63 | 1,875,385,008 |
| 1920 GB | 1,920,383,410,176 | 16,383 | 16 | 63 | 3,750,748,848 |

*Display of total bytes varies from file systems, which means not all of the bytes can be used for storage.

**Notes: 1 GB = 1,000,000,000 bytes; 1 sector = 512 bytes.

LBA count addressed in the table above indicates total user storage capacity and will remain the same throughout the lifespan of the device. However, the total usable capacity of the SSD is most likely to be less than the total physical capacity because a small portion of the capacity is reserved for device maintenance usages.

4.2 Performance

Performance of SV24P-25 is listed below in Table 4-2.

Table 4-2 Performance Specifications

| Performance | Capacity | 120 GB | 240 GB | 480 GB | 960 GB | 1920 GB |
|---------------------------------|--------------------------------|--------|--------|--------|--------|---------|
| | Sequential Read* (MB/s) | | 560 | 560 | 560 | 560 |
| Sequential Write* (MB/s) | | 460 | 480 | 495 | 490 | 480 |
| Random Read IOPS** (4K) | | 66,000 | 95,000 | 96,000 | 96,000 | 96,000 |
| Random Write IOPS** (4K) | | 81,000 | 84,000 | 84,000 | 84,000 | 84,000 |

Note:

Results may differ from various flash configurations or host system setting.

*Sequential performance is based on CrystalDiskMark 5.2.1 with file size 1,000MB.

**Random performance measured using IOMeter with Queue Depth 32.

4.3 Environmental

Environmental specifications of SV24P-25 product are shown in Table 4-3.

Table 4-3 Environmental Specifications

| Environment | Specifications |
|-------------|--|
| Temperature | 0°C to 70°C (Standard); -40°C to 85°C (Wide) |
| | -55°C to 100°C (Non-operation) |
| Vibration | Operation: 7.69(Grms), 20~2000(Hz)/random (compliant with MIL-STD-810G) Non-operation: 4.02(Grms), 15~2000(Hz)/random (compliant with MIL-STD-810G) |
| Shock | Operation: Acceleration, 50(G)/11(ms)/half sine (compliant with MIL-STD-202G) |
| | Non-operation: Acceleration, 1,500(G)/0.5(ms)/half sine (compliant with MIL-STD-883K) |

4.4 Mean Time Between Failures (MTBF)

Mean Time Between Failures (MTBF) is predicted based on reliability data for the individual components in SV24P-25. The prediction result for SV24P-25 is more than 3,000,000 hours.

Note: The MTBF is predicated and calculated based on “Telcordia Technologies Special Report, SR-332, Issue 3” method.

4.5 Certification and Compliance

SV24P-25 complies with the following standards:

- UL
- CE
- FCC
- RoHS
- MIL-STD-810G

4.6 Endurance

The endurance of a storage device is predicted by Drive Writes Per Day based on several factors related to usage, such as the amount of data written into the drive, block management conditions, and daily workload for the drive. Thus, key factors, such as Write Amplifications and the number of P/E cycles, can influence the lifespan of the drive.

Table 4-4 Drive Writes Per Day

| Capacity | Drive Writes Per Day |
|----------|----------------------|
| 120 GB | 3.32 |
| 240 GB | 3.35 |
| 480 GB | 3.45 |
| 960 GB | 3.37 |
| 1920 GB | 3.56 |

Note:

- This estimation complies with JEDEC JESD-219, enterprise endurance workload of random data with payload size distribution.
- Flash vendor guaranteed 3D NAND TLC P/E cycle: 3K
- WAF may vary from capacity, flash configurations and writing behavior on each platform.
- 1 Terabyte = 1,024 GB
- DWPD (Drive Write Per Day) is calculated based on the number of times that user overwrites the entire capacity of an SSD per day of its lifetime during the warranty period. (3D NAND TLC warranty: 2 years)

5. Flash Management

5.1 Error Correction/Detection

SV24P-25 implements a hardware ECC scheme, based on the Low Density Parity Check (LDPC). LDPC is a class of linear block error correcting code which has apparent coding gain over BCH code because LDPC code includes both hard decoding and soft decoding algorithms. With the error rate decreasing, LDPC can extend SSD endurance and increase data reliability while reading raw data inside a flash chip.

5.2 Bad Block Management

Current production technology is unable to guarantee total reliability of NAND flash memory array. When a flash memory device leaves factory, it comes with a minimal number of initial bad blocks during production or out-of-factory as there is no currently known technology that produce flash chips free of bad blocks. In addition, bad blocks may develop during program/erase cycles. Since bad blocks are inevitable, the solution is to keep them in control. Apacer flash devices are programmed with ECC, page mapping technique and S.M.A.R.T to reduce invalidity or error. Once bad blocks are detected, data in those blocks will be transferred to free blocks and error will be corrected by designated algorithms.

5.3 Global Wear Leveling

Flash memory devices differ from Hard Disk Drives (HDDs) in terms of how blocks are utilized. For HDDs, when a change is made to stored data, like erase or update, the controller mechanism on HDDs will perform overwrites on blocks. Unlike HDDs, flash blocks cannot be overwritten and each P/E cycle wears down the lifespan of blocks gradually. Repeatedly program/erase cycles performed on the same memory cells will eventually cause some blocks to age faster than others. This would bring flash storages to their end of service term sooner. Global wear leveling is an important mechanism that levels out the wearing of all blocks so that the wearing-down of all blocks can be almost evenly distributed. This will increase the lifespan of SSDs.

5.4 Flash Translation Layer – Page Mapping

Page mapping is an advanced flash management technology whose essence lies in the ability to gather data, distribute the data into flash pages automatically, and then schedule the data to be evenly written. Page-level mapping uses one page as the unit of mapping. The most important characteristic is that each logical page can be mapped to any physical page on the flash memory device. This mapping algorithm allows different sizes of data to be written to a block as if the data is written to a data pool and it does not need to take extra operations to process a write command. Thus, page mapping is adopted to increase random access speed and improve SSD lifespan, reduce block erase frequency, and achieve optimized performance and lifespan.

5.5 ATA Secure Erase

ATA Secure Erase is an ATA disk purging command currently embedded in most of the storage drives. Defined in ATA specifications, (ATA) Secure Erase is part of Security Feature Set that allows storage drives to erase all user data areas. The erase process usually runs on the firmware level as most of the ATA-based storage media currently in the market are built-in with this command. ATA Secure Erase can securely wipe out the user data in the drive and protects it from malicious attack.

5.6 TRIM

TRIM is a SATA command that helps improve the read/write performance and efficiency of solid-state drives (SSD). The command enables the host operating system to inform SSD controller which blocks contain invalid data, mostly because of the erase commands from host. The invalid will be discarded permanently and the SSD will retain more space for itself.

5.7 SATA Power Management

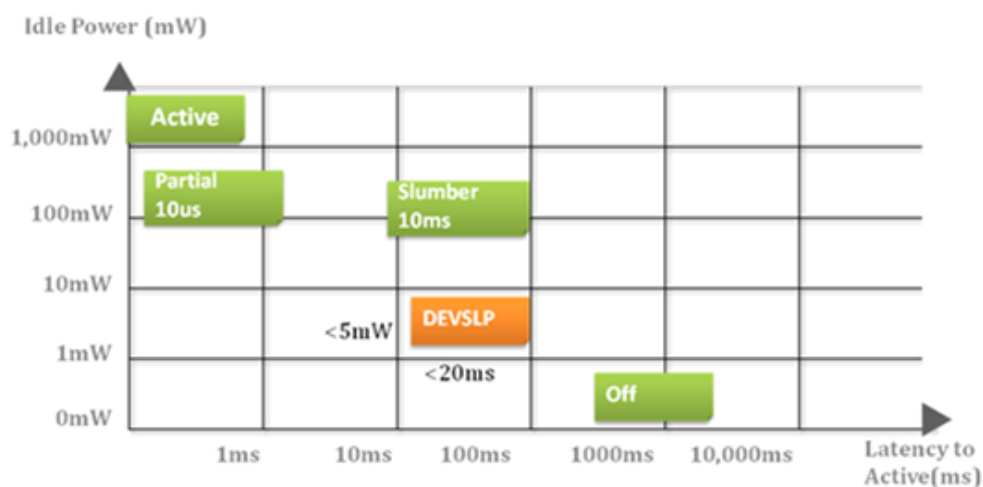
By complying with SATA 6 Gb/s specifications, the SSD supports the following SATA power saving modes:

- ACTIVE: PHY ready, full power, TX & RX operational
- PARTIAL: Reduces power, resumes in under 10 μ s (microseconds)
- SLUMBER: Reduces power, resumes in under 10 ms (milliseconds)
- HIPM: Host-Initiated Power Management
- DIPM: Device-Initiated Power Management
- AUTO-SLUMBER: Automatic transition from partial to slumber.
- Device Sleep (DevSleep or DEVSLP): PHY powered down; power consumption \leq 5 mW; host assertion time \leq 10 ms; exit timeout from this state \leq 20 ms (unless specified otherwise in SATA Identify Device Log).

Note: The behaviors of power management features would depend on host/device settings.

5.8 Device Sleep (DevSleep or DEVSLP) Mode

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



5.9 Hyper Cache Technology

Apacer proprietary Hyper Cache technology uses a portion of the available capacity as SLC (1bit-per-cell) NAND flash memory, called Hyper cache mode. When data is written to SSD, the firmware will direct the data to Hyper Cache mode, providing excellent performance to handle various scenarios in industrial use.

5.10 Over-Provisioning

Over-Provisioning (OP) is a certain portion of the SSD capacity exclusively for increasing Garbage Collection (GC) efficiency, especially when the SSD is filled to full capacity or performs a heavy mixed-random workload. OP has the advantages of providing extended life expectancy, reliable data integrity, and high sustained write performance.

5.11 DataRAID™

Apacer's DataRAID algorithm applies an additional level of protection and error-checking. 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.

5.12 SMART Read Refresh™

Apacer's SMART Read Refresh plays a proactive role in avoiding read disturb errors from occurring to ensure health status of all blocks of NAND flash. Developed for read-intensive applications in particular, SMART Read Refresh is employed to make sure that during read operations, when the read operation threshold is reached, the data is refreshed by re-writing it to a different block for subsequent use.

6. Security and Reliability Features

6.1 Advanced Encryption Standard

Advanced Encryption Standard (AES) is a specification for the encryption of electronic data. AES has been adopted by the U.S. government since 2001 to protect classified information and is now widely implemented in embedded computing applications. The AES algorithm used in software and hardware is symmetric so that encrypting/decrypting requires the same encryption key. Without the key, the encrypted data is inaccessible to ensure information security.

Notably in flash memory applications, AES 256-bit hardware encryption is the mainstream to protect sensitive or confidential data. The hardware encryption provides better performance, reliability, and security than software encryption. It uses a dedicated processor, which is built inside the controller, to process the encryption and decryption. This enormously shortens the processing time and makes it efficient.

6.2 Thermal Sensor

Apacer Thermal Sensor is a digital temperature sensor with serial interface. By using a designated pin for transmission, storage device owners are able to read temperature data.

6.3 End-to-End Data Protection

End-to-End Data Protection is a feature implemented in Apacer SSD products that extends error control to cover the entire path from the host computer to the drive and back, and ensure data integrity at multiple points in the path to enable reliable delivery of data transfers. Unlike ECC which does not exhibit the ability to determine the occurrence of errors throughout the process of data transmission, End-to-End Data Protection allows SSD controller to identify an error created anywhere in the path and report the error to the host computer before it is written to the drive. This error-checking and error-reporting mechanism therefore guarantees the trustworthiness and reliability of the SSD.

7. Software Interface

7.1 Command Set

This section defines the software requirements and the format of the commands the host sends to SV24P-25. Commands are issued to SV24P-25 by loading the required registers in the command block with the supplied parameters, and then writing the command code to the Command register.

Table 7-1 Command Set

| Code | Command | Code | Command |
|------|------------------------------|------|-------------------------|
| E5h | CHECK POWER MODE | F4h | SECURITY ERASE UNIT |
| 06h | DATA SET MANAGEMENT | F5h | SECURITY FREEZE LOCK |
| 92h | DOWNLOAD MICROCODE | F1h | SECURITY SET PASSWORD |
| 90h | EXECUTE DEVICE DIAGNOSTIC | F2h | SECURITY UNLOCK |
| E7h | FLUSH CACHE | 70h | SEEK |
| EAh | FLUSH CACHE EXT | EFh | SET FEATURES |
| ECh | IDENTIFY DEVICE | C6h | SET MULTIPLE MODE |
| E3h | IDLE | E6h | SLEEP |
| E1h | IDLE IMMEDIATE | B0h | SMART |
| 91h | INITIALIZE DEVICE PARAMETERS | E2h | STANDBY |
| E4h | READ BUFFER | E0h | STANDBY IMMEDIATE |
| C8h | READ DMA | E8h | WRITE BUFFER |
| 25h | READ DMA EXT | CAh | WRITE DMA |
| 60h | READ FPDMA QUEUED | 35h | WRITE DMA EXT |
| C4h | READ MULTIPLE | 3Dh | WRITE DMA FUA EXT |
| 29h | READ MULTIPLE EXT | 61h | WRITE FPDMA QUEUED |
| 2Fh | READ LOG EXT | 3Fh | WRITE LOG EXT |
| 47h | READ LOG DMA EXT | 57h | WRITE LOG DMA EXT |
| 20h | READ SECTOR | C5h | WRITE MULTIPLE |
| 24h | READ SECTOR EXT | 39h | WRITE MULTIPLE EXT |
| 40h | READ VERIFY SECTORS | CEh | WRITE MULTIPLE FUA EXT |
| 42h | READ VERIFY SECTORS EXT | 30h | WRITE SECTOR |
| 10h | RECALIBRATE | 34h | WRITE SECTOR EXT |
| F6h | SECURITY DISABLE PASSWORD | 45h | WRITE UNCORRECTABLE EXT |
| F3h | SECURITY ERASE PREPARE | | |

7.2 S.M.A.R.T.

S.M.A.R.T. is an abbreviation for Self-Monitoring, Analysis and Reporting Technology, 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. Ideally, this should allow taking proactive actions to prevent drive failure and make use of S.M.A.R.T. information for future product development reference.

Apacer devices use the standard SMART command B0h to read data out from the drive to activate our S.M.A.R.T. feature that complies with the ATA/ATAPI specifications. S.M.A.R.T. Attribute IDs shall include initial bad block count, total later bad block count, maximum erase count, average erase count, power on hours and power cycle. When the S.M.A.R.T. Utility running on the host, it analyzes and reports the disk status to the host before the device reaches in critical condition.

Note: Attribute IDs may vary from product models due to various solution design and supporting capabilities.

Apacer memory products come with S.M.A.R.T. commands and subcommands for users to obtain information of drive status and to predict potential drive failures. Users can take advantage of the following commands/subcommands to monitor the health of the drive.

Table 7-2 SMART Subcommand Set

| Code | SMART Subcommand |
|------|-----------------------------------|
| D0h | READ DATA |
| D1h | READ ATTRIBUTE THRESHOLDS |
| D2h | ENABLE/DISABLE ATTRIBUTE AUTOSAVE |
| D4h | EXECUTE OFF-LINE IMMEDIATE |
| D5h | SMART READ LOG |
| D6h | SMART WRITE LOG |
| D8h | ENABLE OPERATIONS |
| D9h | DISABLE OPERATIONS |
| DAh | RETURN STATUS |

Table 7-3 General SMART Attribute Structure

| Byte | Description |
|-------|-------------|
| 0 | ID (Hex) |
| 1 – 2 | Status Flag |
| 3 | Value |
| 4 | Worst |
| 5*-11 | Raw Data |

*Byte 5: LSB

Table 7-4 SMART Attribute ID List

| ID (Hex) | Attribute Name |
|------------|------------------------------------|
| 9 (0x09) | Power-on Hours |
| 12 (0x0C) | Power Cycle Count |
| 163 (0xA3) | Max. Erase Count |
| 164 (0xA4) | Avg. Erase Count |
| 166 (0xA6) | Total Later Bad Block Count |
| 167 (0xA7) | SSD Protect Mode (Vendor Specific) |
| 168 (0xA8) | SATA PHY Error Count |
| 171 (0xAB) | Program Fail Count |
| 172 (0xAC) | Erase Fail Count |
| 175 (0xAF) | Bad Cluster Table Count |
| 192 (0xC0) | Unexpected Power Loss Count |
| 194 (0xC2) | Temperature |
| 231 (0xE7) | Lifetime Left |
| 241 (0xF1) | Total Sectors of Write |

8. Electrical Specifications

8.1 Operating Voltage

Table 8-1 lists the supply voltage for SV24P-25.

Table 8-1 Operating Range

| Item | Range |
|----------------|--------------|
| Supply Voltage | 5V \pm 10% |

8.2 Power Consumption

Table 8-2 lists the power consumption for SV24P-25.

Table 8-2 Power Consumption

| Mode \ Capacity | 120 GB | 240 GB | 480 GB | 960 GB | 1920 GB |
|-----------------|--------|--------|--------|--------|---------|
| Active (mA) | 400 | 410 | 430 | 480 | 485 |
| Idle (mA) | 55 | 55 | 55 | 60 | 65 |

Note:

*All values are typical and may vary depending on flash configurations or host system settings.

**Active power is an average power measurement performed using CrystalDiskMark with 128KB sequential read/write transfers.

8.3 Apacer CorePower

If the voltage supply is cut, for instance, accidental power off or sudden blackout, the data would be shortly lost. To protect SSD data integrity from this disastrous scenario, Apacer has developed the hardware-based technology named Apacer CorePower. The CorePower equips SSDs with electrolytic capacitors that can deliver urgent power current so that the flash controller can take this extended moment to flush cached data and essential metadata into NAND Flash blocks.

In addition to electrolytic capacitors which guarantee SSD data integrity, an inbuilt IC detector also serves the same purpose as well as ensures the stability of data transmission. The detector is designed to take proactive measures for the aforementioned disastrous scenario. When supply voltage drops below a minimum threshold, the detector will send out signals to the flash controller notifying it to stop operating to prevent poor performance or erratic operation. In the meanwhile, signals will also be sent to DRAM to have cached data flushed into NAND Flash blocks so as to avoid data loss, similar to the function performed by electrolytic capacitors.

SV24P-25 is equipped with Tantalum Capacitors which have lower power leakage, higher operating temperature and higher volume-efficiency (high capacitance in small volume) than many other types of capacitors. The compact size and the high reliability are ideal for embedded computing systems.

9. Physical Characteristics

9.1 Dimensions

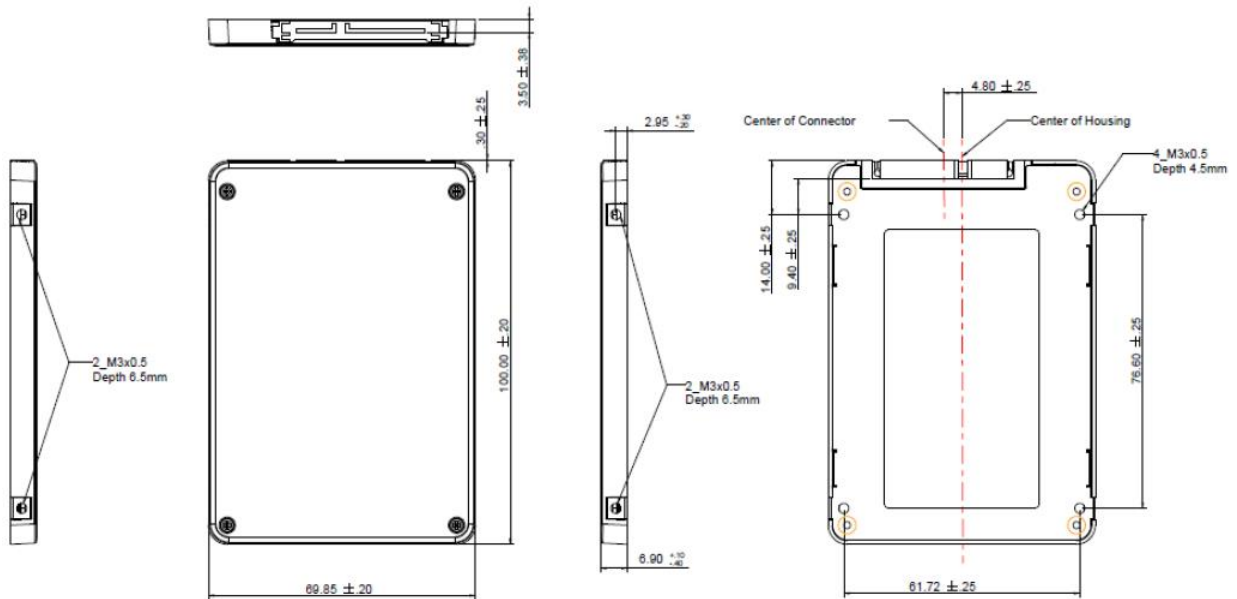


Figure 9-1 Physical Dimensions

9.2 Net Weight

Table 9-1 Net Weight

| Capacity | Net Weight (g ± 5%) |
|----------|---------------------|
| 120GB | 61.67 |
| 240GB | 64.47 |
| 480GB | 66.03 |
| 960GB | 69.3 |
| 1920GB | 69.38 |

10. Product Ordering Information

10.1 Product Code Designations

| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| | A | 1 | 2 | . | P | 2 | 5 | X | X | C | . | 0 | 0 | 1 | 2 | 1 |

| | |
|--|--|
| Code 1-3 (Product Line & Form Factor) | SATA+25 |
| Code 5-6 (Model/Solution) | SV24P-25 |
| Code 7-8 (Product Capacity) | 5H: 120GB 5J: 240GB 5K: 480GB 5L: 960GB 5M: 1920GB |
| Code 9 (Flash Type & Product Temp) | G: 3D TLC Standard temperature H: 3D TLC Wide temperature |
| Code 10 (Product Spec) | 2.5" 7mm plastic housing |
| Code 12-14 (Version Number) | Random numbers generated by system |
| Code 15-16 (Firmware Version) | Thermal Sensor DEVSLP OP |

10.2 Valid Combinations

| Capacity | Standard Temperature | Wide Temperature |
|----------|----------------------|------------------|
| 120GB | A12.P25HGC.00121 | A12.P25HHC.00121 |
| 240GB | A12.P25JGC.00121 | A12.P25JHC.00121 |
| 480GB | A12.P25KGC.00121 | A12.P25KHC.00121 |
| 960GB | A12.P25LGC.00121 | A12.P25LHC.00121 |
| 1920GB | A12.P25MGC.00121 | A12.P25MHC.00221 |

Note: Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

Revision History

| Revision | Description | Date |
|----------|-----------------|-----------|
| 1.0 | Initial release | 9/29/2021 |

Global Presence

Taiwan (Headquarters)

Apacer Technology Inc.

1F., No.32, Zhongcheng Rd., Tucheng Dist.,
New Taipei City 236, Taiwan R.O.C.
Tel: 886-2-2267-8000
Fax: 886-2-2267-2261
amtsales@apacer.com

Japan

Apacer Technology Corp.

6F, Daiyontamachi Bldg., 2-17-12, Shibaura, Minato-Ku,
Tokyo, 108-0023, Japan
Tel: 81-3-5419-2668
Fax: 81-3-5419-0018
jpservices@apacer.com

China

Apacer Electronic (Shanghai) Co., Ltd

Room D, 22/FL, No.2, Lane 600, JieyunPlaza,
Tianshan RD, Shanghai, 200051, China
Tel: 86-21-6228-9939
Fax: 86-21-6228-9936
sales@apacer.com.cn

U.S.A.

Apacer Memory America, Inc.

46732 Lakeview Blvd., Fremont, CA 94538
Tel: 1-408-518-8699
Fax: 1-510-249-9551
sa@apacerus.com

Europe

Apacer Technology B.V.

Science Park Eindhoven 5051 5692 EB Son,
The Netherlands
Tel: 31-40-267-0000
Fax: 31-40-290-0686
sales@apacer.nl

India

Apacer Technologies Pvt Ltd,

1874, South End C Cross, 9th Block Jayanagar,
Bangalore-560069, India
Tel: 91-80-4152-9061/62
Fax: 91-80-4170-0215
sales_india@apacer.com