RoHS Compliant
SATA Flash Drive Series
Datasheet for SFD 25B

December 5, 2019
Revision 1.1

This Specification Describes the Features and Capabilities of the Standard and Industrial Temperature SATA Flash Drives

Please Contact Fortasa Memory Systems Sales for any Custom Features Required For Your Specific Application

1670 So. Amphlett Blvd
Suite 214-33
San Mateo, CA 94402 USA
888-367-8588
www.fortasa.com
Features:

- **Standard Serial SATA 3.2**
  - SATA 3.1 command set compatible
  - Serial SATA 6.0 Gbps Interface
  - Backward compatible with SATA 1.5 and 3.0 Gbps interfaces
  - ATA-8 compatible command set

- **Low power consumption (typical)**
  - Supply voltage: 5V±5%
  - Active mode: 1160 mA
  - Idle mode: 85 mA

- **Capacity**
  - 32, 64, 128, 256, 512 GB

- **NAND flash type**: SLC

- **MTBF (hours)**: >2,000,000

- **Connector Type**
  - 7-pin signal connector
  - 15-pin power connector

- **Performance**
  - Burst transfer rate: 600 MB/sec
  - Sustained read: up to 520 MB/sec
  - Sustained write: up to 540 MB/sec
  - Random read (4K): up to 82,000 IOPS
  - Random write (4K): up to 90,000 IOPS

- **Form factor**
  - 2.5 inch (100.00 x 69.85 x 6.90, unit: mm)

- **RoHS compliant**

- **Shock and Vibration**
  - Shock: 1500g (approx.)
  - Vibration: 15g (approx.)

- **Thermal Sensor for Temperature Management**

- **Intelligent endurance design**
  - Built-in hardware ECC, enabling up to 120 bits error in 2K Byte block
  - Global wear-leveling scheme together with dynamical block allocation to significantly increase the lifetime of a flash device and optimize the disk performance
  - Flash bad-block management
  - Power Failure Management
  - ATA Secure Erase
  - SMART Command
  - Trim Command

- **Temperature ranges**
  - Operation:
    - Standard: 0°C to 70°C (32° ~ 158°F)
    - Industrial: -40°C to 85°C (-40° ~ 185°F)
  - Storage: -40°C to 100°C (-40° ~ 212°F)

- **Endurance in Terabytes Written (TBW)**
  - 32 GB: 1,136 TBW
  - 64 GB: 2,314 TBW
  - 128 GB: 4,629 TBW
  - 256 GB: 9,202 TBW
  - 512 GB: 10,033 TBW

- **Cryptographic Erase/Zerorize (Optional)**

- **Security**
  - AES 256 Hardware Encryption
  - TCG OPAL SSC V2.0 Compliant
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1 Product Description

1.1 General Description

Fortasa’s SFD25B is a high-performance, SATA interface, solid state drive (SSD) designed to replace a conventional SATA hard disk drive. SFD supports standard SATA protocol and can be plugged into a standard SATA connector commonly found in rugged laptops, military devices, thin clients, Point of Sale (POS) terminals, telecom, medical instruments, surveillance systems and industrial PCs. Fortasa SFD Series is the best drop-in replacement for high-maintenance HDD where reliability is of a major importance.

The SFD25B drive offers capacities of up to 512 gigabytes, providing full support for the SATA 6GBps high-speed interface standard. It can operate at sustained access rates of up to 550 megabytes per second, which is much faster than other solid-state or traditional HDD SATA drives currently available on the market.

SFD25B offers high reliability global data wear-leveling scheme to allow uniform use of all storage blocks, increasing the lifetime of Flash media and optimizing drive performance. The SFD25B also offers Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) feature that follows the ATA/ATAPI specifications and uses the standard SMART command B0h to read data from the drive. This capability monitors the drive accesses and provides the host with vital information about drive condition to schedule maintenance and service times.

1.2 Functional Block

The SFD25B drive includes a SATA 6.0 Gbps Flash Controller and flash media. The Flash controller integrates the flash management unit to support multi-channel, multi-bank flash arrays.

1.3 Capacity Specification

Standard capacity specification of the SATA Flash Drive product is shown in Table 1-1. The table lists the specific capacity and the default numbers of heads, sectors and cylinders (CHS) for each product line.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Total Bytes</th>
<th>Cylinders</th>
<th>Heads</th>
<th>Sectors</th>
<th>Max LBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>32GB</td>
<td>32,017,047,552</td>
<td>16383(^1)</td>
<td>16</td>
<td>63</td>
<td>62,533,296</td>
</tr>
<tr>
<td>64GB</td>
<td>64,023,257,088</td>
<td>16383(^1)</td>
<td>16</td>
<td>63</td>
<td>125,045,424</td>
</tr>
<tr>
<td>128GB</td>
<td>128,035,676,160</td>
<td>16383(^1)</td>
<td>16</td>
<td>63</td>
<td>250,069,680</td>
</tr>
<tr>
<td>256GB</td>
<td>256,060,514,304</td>
<td>16383(^1)</td>
<td>16</td>
<td>63</td>
<td>500,118,192</td>
</tr>
<tr>
<td>512GB</td>
<td>512,110,190,592</td>
<td>16383(^1)</td>
<td>16</td>
<td>63</td>
<td>1,000,215,216</td>
</tr>
</tbody>
</table>

\(^1\) Cylinders, heads or sectors are not applicable for these capacities. Only LBA addressing applies.

Please contact factory for any non-listed SATA Flash Drive capacity or custom CHS requirement.
1.4 Performance Specification

Performances of the SATA Flash Drive are listed in Table 1-2.

Table 1-2: High Performance specifications

<table>
<thead>
<tr>
<th>Performance</th>
<th>Capacity</th>
<th>32GB</th>
<th>64GB</th>
<th>128GB</th>
<th>256GB</th>
<th>512GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained read (MB/s)</td>
<td></td>
<td>505</td>
<td>505</td>
<td>495</td>
<td>515</td>
<td>520</td>
</tr>
<tr>
<td>Sustained write (MB/s)</td>
<td></td>
<td>320</td>
<td>530</td>
<td>540</td>
<td>540</td>
<td>515</td>
</tr>
<tr>
<td>Random Read IOPS (4K)</td>
<td></td>
<td>82,000</td>
<td>82,000</td>
<td>80,000</td>
<td>80,000</td>
<td>71,000</td>
</tr>
<tr>
<td>Random Write IOPS (4K)</td>
<td></td>
<td>55,000</td>
<td>90,000</td>
<td>90,000</td>
<td>89,000</td>
<td>87,000</td>
</tr>
</tbody>
</table>

Note: Performance varies from flash configurations or host system settings.
IOPS: measured on 8GB span (16777216 sectors Disk Size), 32 Outstanding I/Os (QD=32), Full Random Data pattern, 4KB Align I/Os and test durations 15minutes

1.5 Pin Assignments

Figure 1-2: Micro-SATA connectors

Table 1-3: Signal Segment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td>Ground</td>
</tr>
<tr>
<td>S2</td>
<td>RxP</td>
<td>Serial Data Receiver</td>
</tr>
<tr>
<td>S3</td>
<td>RxN</td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td></td>
<td>Ground</td>
</tr>
<tr>
<td>S5</td>
<td>TxN</td>
<td>Serial Data Transmitter</td>
</tr>
<tr>
<td>S6</td>
<td>TxP</td>
<td></td>
</tr>
<tr>
<td>S7</td>
<td></td>
<td>Ground</td>
</tr>
</tbody>
</table>
Table 1-4: Power Segment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Not Used (3.3V)</td>
</tr>
<tr>
<td>P2</td>
<td>Not Used (3.3V)</td>
</tr>
<tr>
<td>P3</td>
<td>Unused or Device Sleep *</td>
</tr>
<tr>
<td>P4</td>
<td>Ground</td>
</tr>
<tr>
<td>P5</td>
<td>Ground</td>
</tr>
<tr>
<td>P6</td>
<td>Ground</td>
</tr>
<tr>
<td>P7</td>
<td>5V</td>
</tr>
<tr>
<td>P8</td>
<td>5V</td>
</tr>
<tr>
<td>P9</td>
<td>5V</td>
</tr>
<tr>
<td>P10</td>
<td>Ground</td>
</tr>
<tr>
<td>P11</td>
<td>DAS</td>
</tr>
<tr>
<td>P12</td>
<td>Ground</td>
</tr>
<tr>
<td>P13</td>
<td>Not used (12V)</td>
</tr>
<tr>
<td>P14</td>
<td>Not Used (12V)</td>
</tr>
<tr>
<td>P15</td>
<td>Not Used (12V)</td>
</tr>
</tbody>
</table>

*P3 can be configured as Device Sleep trigger by Configuration Option
2. Software Interface

2.1 Command Set
Table 2-1 summarizes the command set with the paragraphs that follow describing the individual commands and the task file for each.

Table 2-1: Command set

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Command</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check-Power-Mode</td>
<td>E5H</td>
<td>Security-Disable-Password</td>
<td>F6H</td>
</tr>
<tr>
<td>Execute-Drive-Diagnostic</td>
<td>90H</td>
<td>Security-Erase-Prepare</td>
<td>F3H</td>
</tr>
<tr>
<td>Flush-Cache</td>
<td>E7H</td>
<td>Security-Erase-Unit</td>
<td>F4H</td>
</tr>
<tr>
<td>Identify-Drive</td>
<td>ECH</td>
<td>Security-Freeze-Lock</td>
<td>F5H</td>
</tr>
<tr>
<td>Idle</td>
<td>E3H</td>
<td>Security-Set-Password</td>
<td>F1H</td>
</tr>
<tr>
<td>Idle-Immediate</td>
<td>E1H</td>
<td>Security-UnLock</td>
<td>F2H</td>
</tr>
<tr>
<td>Initialize-Drive-Parameters</td>
<td>91H</td>
<td>Seek</td>
<td>7XH</td>
</tr>
<tr>
<td>Read DMA</td>
<td>C8H</td>
<td>Set-Features</td>
<td>EFH</td>
</tr>
<tr>
<td>Read DMA EXT</td>
<td>25H</td>
<td>Set-Multiple-Mode</td>
<td>C6H</td>
</tr>
<tr>
<td>Read FPDMA Queued</td>
<td>60H</td>
<td>Set-Sleep-Mode</td>
<td>E6H</td>
</tr>
<tr>
<td>Read Log DMA EXT</td>
<td>47H</td>
<td>SMART</td>
<td>B0H</td>
</tr>
<tr>
<td>Read Log EXT</td>
<td>2FH</td>
<td>Stand-By</td>
<td>E2H</td>
</tr>
<tr>
<td>Read-Multiple</td>
<td>C4H</td>
<td>Stand-By-Immediate</td>
<td>E0H</td>
</tr>
<tr>
<td>Read-Sector</td>
<td>20H</td>
<td>Write DMA</td>
<td>CAH</td>
</tr>
<tr>
<td>Read-Verify-Sectors</td>
<td>40H</td>
<td>Write DMA EXT</td>
<td>35H</td>
</tr>
<tr>
<td>Recalibrate</td>
<td>10H</td>
<td>Write FPDMA Queued</td>
<td>61H</td>
</tr>
<tr>
<td>Write Log DMA EXT</td>
<td>57H</td>
<td>Write Log EXT</td>
<td>3FH</td>
</tr>
<tr>
<td>Write-Multiple</td>
<td>C5H</td>
<td>Write-Sector</td>
<td>30H</td>
</tr>
</tbody>
</table>

2.2 Cryptographic Erase/Zerorize Command Features (optional)

For Fortasa SSDs that have AES-256 Encryption enabled, optional Cryptographic Erase can be implemented. When this command is utilized; it will force the Encryption key change in the AES-256 Module. Once the Encryption key is changed the following information stored on the SSD will become un-decryptable (unrecoverable).

1) All User Data
2) FAT File structure related data
3) Any OS Format related data

The following information stored on the SSD will remain intact and recoverable:

1) Bad Block Information
2) SMART command related Information
3) Low Level Format for drive recovery

After the Cryptographic Erase command has been issued, the drive can be re-formatted and reused. However, data stored pre-issuance of Cryptographic Erase command will not be recoverable.
3. Flash Management

3.1 Error Correction/Detection
The SATA Flash Drive implements a hardware BCH-based ECC scheme to achieve up to 120 bit correction per 2048-byte page.

3.2 Wear Leveling
All NAND flash devices are limited by a finite number of write cycles. Under a standard file system, frequent file table updates are mandatory. As a painful side effect of OS file overhead, some areas of flash address space wear out faster than others. As these certain sections get a substantially higher write occurrence the whole SATA Flash Drive can wear out very quickly. This uneven wear would significantly reduce the lifetime of the whole device, even if majority of the Flash sectors are far from the write cycle limit. Fortasa’s SATA Flash Drive products offer advanced data wear leveling which distributes Flash writes evenly across the SATA Flash Drive memory space. By utilizing this advanced wear leveling feature, the lifetime of the media can be significantly extended.

3.3 Power Failure Management
The Low Power Detection on the Flash controller initiates cached data saving before the power supply to the device drops too low for operation. This feature prevents the device from system crash and ensures data integrity during an unexpected brownout. This feature makes sure that there are no catastrophic failures of the SATA Flash Drive due to system power glitches.

Note: The Flash controller unit of this product model is designed with an External DRAM as a write cache for improved performance and data efficiency. Though unlikely to happen in most cases, the data cached in the volatile DRAM might be potentially affected if a sudden power loss / brown-out condition takes place before the cached data is flushed into non-volatile NAND flash memory.

3.4 ATA Secure Erase
Accomplished by the Secure Erase (SE) command, which added to the open ANSI standards that control disk drives, “ATA Secure Erase” is built into the disk drive itself and thus far less susceptible to malicious software attacks than external software utilities. It is a positive easy-to-use data destroy command, amounting to electronic data shredding. Executing the command causes a drive to internally completely erase all possible user data. This command is carried out within disk drives, so no additional software is required. The erase process will not stop until it is completed. In case of power failure, the erase process will continue when the power is reapplied to the device.
3.5 S.M.A.R.T. Technology

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure.

### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>SMART Subcommand</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0h</td>
<td>READ DATA</td>
</tr>
<tr>
<td>D1h</td>
<td>READ ATTRIBUTE THRESHOLDS</td>
</tr>
<tr>
<td>D2h</td>
<td>Enable/Disable Attribute Autosave</td>
</tr>
<tr>
<td>D4h</td>
<td>Execute Off-line Immediate</td>
</tr>
<tr>
<td>D5h</td>
<td>Read Log (optional)</td>
</tr>
<tr>
<td>D6h</td>
<td>Write Log (optional)</td>
</tr>
<tr>
<td>D8h</td>
<td>Enable Operations</td>
</tr>
<tr>
<td>D9h</td>
<td>Disable operations</td>
</tr>
<tr>
<td>DAh</td>
<td>Return Status</td>
</tr>
</tbody>
</table>

### General SMART attribute structure

<table>
<thead>
<tr>
<th>Byte</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ID (Hex)</td>
</tr>
<tr>
<td>1 – 2</td>
<td>Status flag</td>
</tr>
<tr>
<td>3</td>
<td>Value</td>
</tr>
<tr>
<td>4</td>
<td>Worst</td>
</tr>
<tr>
<td>5*–11</td>
<td>Raw Data</td>
</tr>
</tbody>
</table>

*Byte 5: LSB

### SMART attribute ID list

<table>
<thead>
<tr>
<th>ID (Hex)</th>
<th>Attribute Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 (0x09)</td>
<td>Power-on hours</td>
</tr>
<tr>
<td>12 (0xC)</td>
<td>Power cycle count</td>
</tr>
<tr>
<td>163 (0xA3)</td>
<td>Maximum Erase Count</td>
</tr>
<tr>
<td>164 (0xA4)</td>
<td>Average Erase Count</td>
</tr>
<tr>
<td>166 (0xA6)</td>
<td>Total Later Block Count</td>
</tr>
<tr>
<td>167 (0xA7)</td>
<td>SSD Protect Mode (vendor specific)</td>
</tr>
<tr>
<td>168 (0xA8)</td>
<td>SATA PHY Error Count</td>
</tr>
<tr>
<td>171 (0xAB)</td>
<td>Program fail count</td>
</tr>
<tr>
<td>172 (0xAC)</td>
<td>Erase fail count</td>
</tr>
<tr>
<td>175 (0xAF)</td>
<td>Bad Cluster Table Count</td>
</tr>
<tr>
<td>192 (0xC0)</td>
<td>Unexpected Power Loss Count</td>
</tr>
<tr>
<td>194 (0xC2)</td>
<td>Temperature</td>
</tr>
<tr>
<td>231 (0xE7)</td>
<td>Lifetime left</td>
</tr>
<tr>
<td>241 (0xF1)</td>
<td>Total sectors of write</td>
</tr>
</tbody>
</table>
3.6 TRIM Command Support
Over time the performance of SSD degrades as user continually writes and erases data. The ATA-TRIM command “formats” the SSD to optimize the drive performance. A TRIM enabled SSD running an OS with TRIM support will stay closer to its peak performance without much performance variance.

4. Environmental Specifications

4.1 Environments
Environmental specification of the SATA Flash Drive series follows the MIL-STD-810F standard as shown in Table 4-1.

Table 4-1: Environmental specifications

<table>
<thead>
<tr>
<th>Environment</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>0°C to 70°C (standard); -40°C to 85°C (industrial)</td>
</tr>
<tr>
<td>Storage</td>
<td>-40°C to 100°C</td>
</tr>
<tr>
<td>Vibration</td>
<td>Sine wave: 5<del>55</del>5 Hz (X, Y, Z)</td>
</tr>
<tr>
<td>Random</td>
<td>10-2000 Hz, 16.3 G (X, Y, Z)</td>
</tr>
<tr>
<td>Shock-Operating</td>
<td>Acceleration: 1,500 G, 0.5 ms</td>
</tr>
<tr>
<td></td>
<td>Peak acceleration: 50 G, 11 ms</td>
</tr>
<tr>
<td>Altitude</td>
<td>80,000 ft</td>
</tr>
</tbody>
</table>

4.2 Mean Time Between Failures (MTBF)
Mean Time Between Failures (MTBF) is predicted based on reliability data for the individual components in the SFD drive. Based on provided component data, SATA Flash Drive is rated at more than 2,000,000 hours.

Notes about the MTBF:
The MTBF is predicated and calculated based on “Telcordia Technologies Special Report, SR-332, Issue 2” method.

4.3 Certification and Compliance
The SFD25B complies with the following standards:
- CE
- FCC
- RoHS
- MIL-STD-810F
4.4 Endurance

The endurance of a storage device is predicted by TeraBytes Written 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>
<thead>
<tr>
<th>Capacity</th>
<th>TeraBytesWritten (TBW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 GB</td>
<td>1,136</td>
</tr>
<tr>
<td>64 GB</td>
<td>2,134</td>
</tr>
<tr>
<td>128 GB</td>
<td>4,629</td>
</tr>
<tr>
<td>256 GB</td>
<td>9,202</td>
</tr>
<tr>
<td>512 GB</td>
<td>10,033</td>
</tr>
</tbody>
</table>

Notes:
The measurement assumes the data written to the SSD for test is under a typical and constant rate. The measurement follows the standard metric: 1 TB (Terabyte) = 1000 GB

5. Electrical Specification

5.1 Operating Voltage

*Caution: Absolute Maximum Stress Ratings* – Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.

**Table 5-1**: Operating range

<table>
<thead>
<tr>
<th>Range</th>
<th>Ambient Temperature</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>0°C to +70°C</td>
<td>5.0 V ±10% (4.5-5.5 V)</td>
</tr>
<tr>
<td>Industrial</td>
<td>-40°C to 85°C</td>
<td>5.0 V ±10% (4.5-5.5 V)</td>
</tr>
</tbody>
</table>

5.2 Power Consumption

Table 5-2 lists the SFD 25B power consumption.

**Table 5-2**: Typical power consumption (Standard Speed)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Capacity</th>
<th>32GB</th>
<th>64GB</th>
<th>128GB</th>
<th>256GB</th>
<th>512GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Mode (mA)</td>
<td>510</td>
<td>715</td>
<td>730</td>
<td>775</td>
<td>1160</td>
<td></td>
</tr>
<tr>
<td>Idle Mode (mA)</td>
<td>47</td>
<td>47</td>
<td>47</td>
<td>48</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>
6. Physical Characteristics

6.1 Dimensions

Figure 6-1 illustrates the overall dimensions of the SFD drive, as listed in Table 6-1.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Millimeters (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>6.90 ± 0.20</td>
</tr>
<tr>
<td>Width</td>
<td>69.84 ± 0.20</td>
</tr>
<tr>
<td>Length</td>
<td>100.00 ± 0.20</td>
</tr>
</tbody>
</table>
7. Product Ordering Information

7.1 Product Code Designations

FMS – SFD25B

X  xxxx -  I  A  T   Z

Version Control

Flash Type:
T: Toshiba

Features
Blank: Standard
S: Zerorize Command

Temperature Range
Blank: Standard
I: Industrial Temperature

Capacity
032G: 32GB
064G: 64GB
128G: 128GB
256G: 256GB
512G: 512GB

Housing Size
C: 7 mm

2.5” SATA Flash Drive

Fortasa Memory Systems Product Code
7.2 Valid Combinations

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard Temperature Model Numbers</th>
<th>Industrial Temperature Model Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>32GB</td>
<td>FMS-SFD25BC032G-AT</td>
<td>FMS-SFD25BC032G-IAT</td>
</tr>
<tr>
<td>64GB</td>
<td>FMS-SFD25BC064G-AT</td>
<td>FMS-SFD25BC064G-IAT</td>
</tr>
<tr>
<td>256GB</td>
<td>FMS-SFD25BC256G-AT</td>
<td>FMS-SFD25BC256G-IAT</td>
</tr>
<tr>
<td>512GB</td>
<td>FMS-SFD25BC512G-AT</td>
<td>FMS-SFD25BC512G-IAT</td>
</tr>
</tbody>
</table>

**CryptoErase Command Enabled**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard Temperature Model Numbers</th>
<th>Industrial Temperature Model Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>32GB</td>
<td>FMS-SFD25BC032G-ATS</td>
<td>FMS-SFD25BC032G-IATS</td>
</tr>
<tr>
<td>64GB</td>
<td>FMS-SFD25BC064G-ATS</td>
<td>FMS-SFD25BC064G-IATS</td>
</tr>
<tr>
<td>256GB</td>
<td>FMS-SFD25BC256G-ATS</td>
<td>FMS-SFD25BC256G-IATS</td>
</tr>
<tr>
<td>512GB</td>
<td>FMS-SFD25BC512G-ATS</td>
<td>FMS-SFD25BC512G-IATS</td>
</tr>
</tbody>
</table>

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your Fortasa sales representative to confirm availability of valid combinations and to determine availability of new product combinations.
## 8. Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>6/28/2019</td>
<td>Initial Release</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>12/5/2019</td>
<td>Completed endurance rating for 512GB at Endurance on Specifications Overview page and 5.4 Endurance</td>
<td></td>
</tr>
</tbody>
</table>