SMART MODULAR TECHNOLOGIES

SMART Modular Technologies is a global leader in specialty memory solutions serving the electronics industry for over 25 years. SMART Modular delivers solutions to a broad customer base, including OEMs that compete in the computing, networking, communications, storage, mobile and industrial markets.

Focused on providing extensive customer-specific design capabilities, technical support and value-added testing services, SMART collaborates closely with their global OEM customers throughout their design process and across multiple projects to create memory solutions for demanding applications with differentiated requirements. Taking innovations from the design stage through manufacturing and supply, SMART Modular has developed a comprehensive product line comprised of DRAM and Flash memory technologies across various form factors.

GLOBAL FOOTPRINT
SMART Modular Technologies designs and manufactures industrial-grade flash storage products with industry standard interfaces in a variety of form factors and capacities. Offering high performance, exceptional reliability, and endurance in a very small package, these products are ideal for OEMs designing, networking, telecommunications, mobile and embedded, automotive, GPS, and industrial computing appliances. SMART provides consistent quality and long product life cycles. Most products are available in Commercial and Industrial operating temperature ranges. Strong relationships with numerous suppliers of flash and controller ICs allow SMART to offer a wide range of cost-effective products to its customers.

**Embedded Storage Solutions**

**Slim SATA**

- Networking
- Telecom
- Industrial
- Storage

SMART’s Slim SATA X10, XP+, XL+, and Value Series (SATA III) are JEDEC MO-300A standard embedded SSDs. Slim SATA is ideally suited for use in a wide variety of OEM storage applications that require multiple supply chains, design interoperability, rapid time to market, and long product life cycles. The X10 product is SMART’s latest product, which has enterprise class features, including NAND RAID protection.

**Slim SATA SSD**

<table>
<thead>
<tr>
<th>Type</th>
<th>Density</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slim SATA XP+ SLC</td>
<td>8GB to 128GB</td>
<td>SG9SLM6E128GHS01*</td>
</tr>
<tr>
<td>Slim SATA XL+ SLC</td>
<td>8GB to 64GB</td>
<td>SH9MST6D64GJSI21*</td>
</tr>
<tr>
<td>Slim SATA X10 MLC</td>
<td>60GB to 480GB</td>
<td>SV9SLM6B480GLM02*</td>
</tr>
<tr>
<td>Slim SATA Value Series MLC</td>
<td>8GB to 64GB</td>
<td>SV9SLM6B064GJM21*</td>
</tr>
</tbody>
</table>

* Part number noted is that of highest density available

**mSATA**

- Networking
- Telecom
- Storage
- Servers

SMART’s mSATA X10, XP+, XL+, and Value Series (SATA III) are JEDEC MO-300A standard embedded SSDs. Providing high performance in a small form factor, mSATA is ideally suited for use in a wide variety of OEM storage applications that require multiple supply chains, design interoperability, rapid time to market, and long product life cycles. The X10 product is SMART’s latest product which has enterprise class features, including NAND RAID protection and over provisioning to increase endurance.

**mSATA SSD**

<table>
<thead>
<tr>
<th>Type</th>
<th>Density</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>mSATA XP+ SLC</td>
<td>8GB to 128GB</td>
<td>SH9MST6D128GHS01*</td>
</tr>
<tr>
<td>mSATA XL+ SLC</td>
<td>8GB to 64GB</td>
<td>SH9MST6D64GJSI21*</td>
</tr>
<tr>
<td>mSATA X10 MLC</td>
<td>60GB to 480GB</td>
<td>SV9MST6D480GLM02*</td>
</tr>
<tr>
<td>mSATA Value Series</td>
<td>8GB to 64GB</td>
<td>SV9MST6D064GJM21*</td>
</tr>
</tbody>
</table>

* Part number noted is that of highest density available
Utilizing an industry standard M.2 SATA interface and connector, X10, XP+, and Values Series product in 2242, 2260 and 2280-D2-B-M form factors offer best-in-class sequential and random read/write performance in transaction intensive applications. M.2 SATA can be easily integrated into a host system without any special BIOS modifications or additional device drivers. The X10 product is SMART’s latest product which has enterprise class features, including NAND RAID protection and over provisioning to increase endurance.

### M.2 SATA Modules

<table>
<thead>
<tr>
<th>M.2 2260 D2-B-M MLC</th>
<th>60GB to 240GB</th>
<th>SV9M2S66D240GLM21*</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.2 2280 D2-B-M MLC</td>
<td>60GB to 480GB</td>
<td>SV9M2S86D480GLM21*</td>
</tr>
<tr>
<td>M.2 2280 MLC</td>
<td>16GB to 480GB</td>
<td>SV9M2S86D480GLM21*</td>
</tr>
<tr>
<td>M.2 2242 Value Series MLC</td>
<td>8GB to 128GB</td>
<td>SV9M2S46D128GJM21*</td>
</tr>
</tbody>
</table>

* Part number noted is that of highest density available

### Densities from 8GB up to 480GB

#### Networking

#### Telecom

#### Storage

SMART’s industrial-grade embedded USB (eUSB) flash drives feature sustained read speeds of up to 33 MB/s, write speeds up to 21 MB/s and seek time of typically 500 uS. eUSB Plus integrates SMART’s industrial grade eMMC product and a USB bridge chip to create a cost-effective eUSB solution.

### eUSB

<table>
<thead>
<tr>
<th>eUSB Standard Connector</th>
<th>1GB to 32GB</th>
<th>SHEUS2LO32GQDUx*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Profile Connector</td>
<td>1GB to 32GB</td>
<td>SHEUS2UO32GQDUx*</td>
</tr>
<tr>
<td>2mm Connector</td>
<td>1GB to 32GB</td>
<td>SHEUS2M032GQDUx*</td>
</tr>
</tbody>
</table>

x = version code

* Part number noted is that of highest density available

### Densities from 1GB up to 32GB

#### Networking

#### Telecom

#### Medical

#### Industrial

SMART’s 2.5” X10 and XP+ SATA (SATA III) SSDs provide low power, high reliability solid state storage. These SSDs can be used as a direct replacement for an HDD or in ruggedized notebooks and other embedded mobile applications. The X10 is SMART’s latest product which has enterprise class features, including NAND RAID protection and over provisioning to increase endurance.

### 2.5” SATA SSD

<table>
<thead>
<tr>
<th>2.5” SATA SSDs</th>
<th>16GB to 256GB</th>
<th>SH9SAT6E256GM21*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5” SATA XP+ SLC</td>
<td>16GB to 128GB</td>
<td>SH9SAT6E128GM11*</td>
</tr>
<tr>
<td>2.5” SATA XP+ MLC</td>
<td>32GB to 256GB</td>
<td>SH9SAT6E256GM21*</td>
</tr>
</tbody>
</table>

* Part number noted is that of highest density available
**SMART's Enterprise USB Memory Key**

Address the need for enhanced reliability and are designed with the industry's best-in-class read and write speeds, providing reliable operation over the product life cycle.

<table>
<thead>
<tr>
<th>USB Key</th>
<th>DENSITIES FROM 1GB UP TO 32GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB Memory Key SLC</td>
<td>1GB to 16GB</td>
</tr>
<tr>
<td></td>
<td>SG9MK16GQx*</td>
</tr>
<tr>
<td>x = version code</td>
<td></td>
</tr>
<tr>
<td>* Part number noted is that of highest density available</td>
<td></td>
</tr>
</tbody>
</table>

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**SMART's CF Cards**

High-capacity, low-power memory cards that act like hard drives but are reliable, fast and portable. These cards also support self monitoring analysis and reporting technology (S.M.A.R.T.) attributes to help reduce unexpected field failures.

<table>
<thead>
<tr>
<th>Flash Card Products</th>
<th>DENSITIES FROM 128MB UP TO 64GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF Card XL SLC 128MB to 4GB</td>
<td>SS9FD08GH3BAxS01*</td>
</tr>
<tr>
<td>CF Card XL+ SLC 512MB to 64GB</td>
<td>SG9CF64GHYDD*</td>
</tr>
<tr>
<td>* Part number noted is that of highest density available</td>
<td></td>
</tr>
</tbody>
</table>

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**SMART's SD Cards**

Robust and reliable solutions for solid state storage needs. Not to be confused with consumer grade cards, SMART’s SD cards are designed, built and tested to far higher standards of reliability and endurance.

<table>
<thead>
<tr>
<th>SD Card</th>
<th>DENSITIES FROM 8GB UP TO 64GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD XL+ SLC 512MB to 32GB</td>
<td>SH95D032G5NIDSCxx*</td>
</tr>
<tr>
<td>SD XL MLC 8GB to 64GB</td>
<td>SH9D064GPHEDMC21*</td>
</tr>
<tr>
<td>xx = version code</td>
<td>Commercial (y=C), Industrial (y=I), Extended (y=E)</td>
</tr>
<tr>
<td>* Part number noted is that of highest density available</td>
<td></td>
</tr>
</tbody>
</table>

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**SMART's microSD Cards**

Robust and reliable solutions for solid state storage needs. Not to be confused with consumer grade cards, SMART's microSD cards are designed, built and tested to far higher standards of reliability and endurance.

<table>
<thead>
<tr>
<th>microSD Card</th>
<th>DENSITIES FROM 1GB UP TO 64GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>microSD SLC 1GB to 4GB</td>
<td>SH9UD004GPHF95yyx*</td>
</tr>
<tr>
<td>microSD MLC 8GB to 64GB</td>
<td>SH9UD064GPHECMyxx*</td>
</tr>
<tr>
<td>xx = version code</td>
<td>Commercial (y=C), Industrial (y=I), Extended (y=E)</td>
</tr>
<tr>
<td>* Part number noted is that of highest density available</td>
<td></td>
</tr>
</tbody>
</table>

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SMART's industrial microSD cards are robust and reliable solutions for solid state storage needs. Not to be confused with consumer grade cards, SMART’s microSD cards are designed, built and tested to far higher standards of reliability and endurance.

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**SMART's CF Cards**

Robust and reliable solutions for solid state storage needs. Not to be confused with consumer grade cards, SMART’s CF cards are designed, built and tested to far higher standards of reliability and endurance.

Note: *Part number noted is that of highest density available.*
APPLICATIONS

Auto
Advancements in auto electronics usher in the era of the connected car, including feature-rich infotainment systems. Modern auto applications require highly reliable Flash memory technologies to support data storage.

**Embedded Options**
- mSATA
- M.2 SATA
- Slim SATA

**Removable Options**
- SD Card
- microSD

Computing
Computing applications have unique, wide-ranging needs that span multiple architectures, configurations, densities, speeds, and packages required by big data processing.

**Embedded Options**
- M.2 SATA
- mSATA
- eUSB Drives

**Removable Options**
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Communications
Communications applications typically require small to standard form factors. Reduced voltage, high performance, and reliability are also prerequisites for use in the communications arena.

**Embedded Options**
- M.2 SATA
- mSATA
- eUSB Drives

**Removable Options**
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Defense
SMART Modular designs Flash memory to support a broad range of defense applications. Key defense needs for memory require rugged and durable designs with proven reliability in extreme conditions (shock, vibration, dust, humidity, and temperature), technical support, and low power operation.

**Embedded Options**
- M.2 SATA
- mSATA
- eUSB Drives

**Removable Options**
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Gaming
SMART Modular manufactures Flash memory to support a broad range of gaming and media applications. These gaming applications typically require small to standard form factors, reduced voltage demands, high performance, and high reliability.

**Embedded Options**
- M.2 SATA
- mSATA
- eUSB Drives

**Removable Options**
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys
Industrial
Industrial applications often need replacement storage solutions with extended life cycles with a guarantee of a long-term supply. Key features include reliability, security, and performance.

Embedded Options
- M.2 SATA
- mSATA
- eUSB Drives

Removable Options
- Slim SATA
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Networking
Requiring small to standard form factors, networking applications have strict footprint and thermal specifications and need storage solutions with low latency as well as high performance and signal integrity.

Embedded Options
- M.2 SATA
- mSATA
- eUSB Drives

Removable Options
- Slim SATA
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Printers
Printers require compatible, certified memory in a range of speeds, densities, form factors and technologies that offer high quality and performance.

Embedded Options
- M.2 SATA
- mSATA
- eUSB Drives

Removable Options
- Slim SATA
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Servers
Server applications need reliable, high-quality, high-density memory modules with the lowest power consumption. SMART’s industrial grade, low-voltage Flash meet critical requirements.

Embedded Options
- M.2 SATA
- mSATA
- eUSB Drives

Removable Options
- Slim SATA
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys

Storage
Flash memory for storage needs to be highly secure with data protection and encryption capabilities. Storage memory solutions also need to be available in a range of speeds, densities, form factors and technologies.

Embedded Options
- M.2 SATA
- mSATA
- eUSB Drives

Removable Options
- Slim SATA
- CF Card
- SD Card
- microSD
- 2.5" SATA
- USB Memory Keys
CUSTOM PRODUCTS

SMART has a long history of partnering with customers to satisfy their specific design needs. With extensive industry and design expertise and global manufacturing capabilities, SMART offers a unique combination of advantages that can support customers’ unique designs from conception to manufacturing and test. This allows SMART to efficiently and reliably tailor products to meet particular customer needs. For more information, please email customers@smartm.com.

SERVICES

SMART built its reputation by providing proven technology and quality products to the most demanding OEMs around the world. SMART backs these products with outstanding services and expertise in design, manufacturing, test, and logistical support. OEMs can be confident that SMART products will perform to the highest degree of reliability and compatibility, as well as meet all system requirements and OEM specifications. More information on SMART can be obtained at www.smartm.com.

Key Competitive Advantages

- Inventory management of volatile commodity parts
- Established strategic alliances with major semiconductor manufacturers
- Broad custom design and packaging capabilities
- Value-added engineering
- Custom testing capabilities
- Comprehensive pre- and post-sale technical support
- Conformal coating, stacking and component underfill for enhanced ruggedization

SMART Modular Technologies excels in designing, manufacturing, testing, and rapidly delivering both standard and custom modular technologies to OEMs around the world.

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