

Product Detail Page: FerriSSD PCIe Gen3

PART NUMBER	DESCRIPTION
SM681GXC AGST	64GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, TLC Mode
SM681GXD AGST	128GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, TLC Mode
SM681GXE AGST	256GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, TLC Mode
SM681GXF AGST	512GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, TLC Mode
SM681GEC AGST	64GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, TLC Mode
SM681GED AGST	128GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, TLC Mode
SM681GEE AGST	256GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, TLC Mode
SM681GEF AGST	512GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, TLC Mode
SM681GXC AGSS	20GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, SLC Mode
SM681GXD AGSS	40GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, SLC Mode
SM681GXE AGSS	80GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, SLC Mode
SM681GXF AGSS	160GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, C-temp, SLC Mode
SM681GEC AGSS	20GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, SLC Mode
SM681GED AGSS	40GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, SLC Mode
SM681GEE AGSS	80GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, SLC Mode
SM681GEF AGSS	160GB Ferri-PCIe Gen3 BGA SSD, WD BICS5 3D TLC, I-temp, SLC Mode

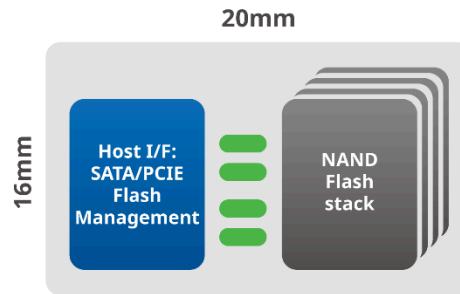
Product specifications

The PCIe NVMe FerriSSD[®] is the ideal boot BGA-SSD for a wide range of embedded applications that features PCIe interface with blazing speed and unsurpassed reliability.

By combining industry proven controller technology, NAND flash and passive components into a compact 16mm x 20mm BGA chip-scale package, PCIe NVMe FerriSSD[®] simplifies design efforts, reduces time-to-market while protecting from NAND technology migration concerns.

Armed with SMI proprietary technologies and programmable firmware, the PCIe NVMe FerriSSD is the ultimate non-volatile storage solution that is easy to design and manufacture. The PCIe NVMe FerriSSD series featuring high throughput transfer rate with optional embedded DRAM to enhance data storage efficiency and high random read/write IOPS. The 8th generation PCIe NVMe FerriSSD leveraging Silicon Motion's most advanced technologies, including IntelligentScan, DataRefresh, high bandwidth LDPC ECC engine with SMI group RAID, and End-to-end data path protection to provide unsurpassed data integrity in a non-volatile storage device. All PCIe NVMe FerriSSD series support 3D SLCmode and TLCmode NAND flash options.

This makes the FerriSSD ideal for a wide range of applications, including car computing, navigation systems, thin clients, point-of-sale terminals, multifunction printers, telecommunications equipment, factory automation tools, and an array of server applications. Whether for business or personal use, the FerriSSD provides ultimate storage performance in a compact form factor, making it an essential component for any embedded computing device.



Why PCIe NVMe FerriSSD®

Lower total cost of ownership & Easy to use

- Small footprint & Plug and Play: Only requires format/fdisk prior to use
- Rugged & Reliable: No moving parts
- Cost-saving with flexible TLCmode™/SLCmode™, configurable capacities

Eliminate down time

- IntelligentScan™/DataRefresh™ : Supports self-scanning w/ proactive data protection
- IntelligentLog™ : Enables self-monitoring, analysis and AER (Advance Error Warning)
- Field programmable firmware available

Full design service from design to after sales support

- SSD life simulation and validation
- Fixed BOM and firmware from ordering part number
- Dedicated technical support team

Key Features

High-Efficiency Error Correction

- Advanced Hardware LDPC (ECC) Engine
- StaticDataRefresh™ and EarlyRetirement™ technologies ensure the data reliability

Power Efficiency

- Dynamic power management technology enables multiple power saving modes

Advanced Global Wear Leveling to Enhance Reliability

- Even distribution of program / erase cycles across all NAND flash chips
- Maximizes the lifespan with low Write Amplification Index (WAI)

Robust Data Protection

- Advanced system level protection against unstable power
- Software / hardware write protect option
- Multiple user data security zones
- Software / hardware secure erase function
- PowerShield and DataPhoenix technologies support power-down data protection

Storage Solutions & Technologies - IntelligentSeries™

SMI is committed to developing innovative storage solutions and harnessing the advanced technologies to ensure that our products deliver the highest levels of data integrity, reliability and quality for mission-critical applications.



IntelligentLog™

Automotive/Server Smart Telemetry with Active Warning



IntelligentGuard™

Data Encryption with Authenticated Firmware Protection



IntelligentThermal™

HCTM / DCTM (Thermal Management)



IntelligentFlush™

Power Flush to Improve Stable Fast Write Performance



IntelligentImage™

Content Preload Service for SMT Reflow



IntelligentZones™

Endurance Groups – Multi-Namespace, etc.



IntelligentScan™

Proven Proactive Data Preservation



IntelligentShield™

Protection against Power Interrupt

For industrial, commercial and automotive applications that require high-performance, customized single-chip SSDs for small footprint equipment operating in demanding environments.

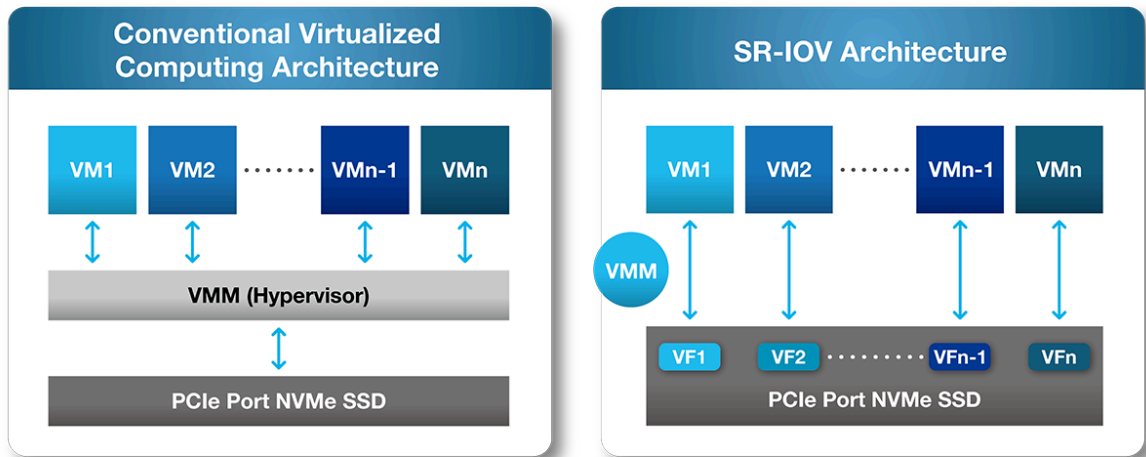


Technologies

FerriSSD® Supports Single Root-IO Virtualization

One Storage Directly Support Virtual I/Os to Multiple VFs

The SR-IOV architecture applies the concept of virtualization. Its architecture provides for the direct connection of multiple automotive modules to an SSD via PCIe channels. This provides the flexibility to run a VM on any supported hardware target and optimizes the usage of the available hardware resources.



The advantage of virtualized architecture is that data transfers no longer need to be routed via the hypervisor (virtual machine manager, or VMM), thus eliminating the delay caused by translating software code from PCIe format into hypervisor format and back again. This also reduces the burden on the CPU in which the hypervisor runs.

Now offered with built-in SR-IOV capability, a single FerriSSD® device from Silicon Motion in a virtualized architecture can support up to eight VMs, which are implemented in hardware on the embedded SSD controller, providing a direct, high-speed PCIe interface to each VM via a dedicated virtual function (VF) implemented in the SSD controller.

Benefits:

Cost saving – replacing multiple, lower performance, less robust storage devices with a single, high-performance SSD.

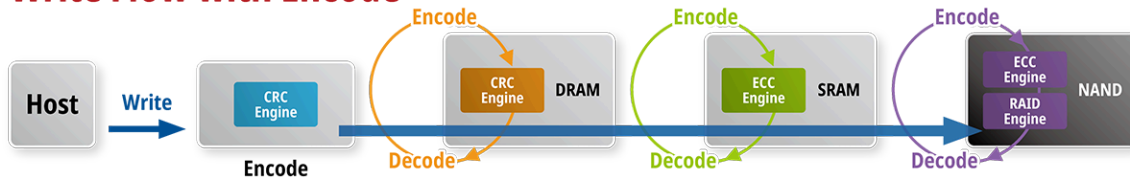
Low Latency – the SR-IOV capability provides for near-native QoS in a flexible virtualized architecture.

Reduced CPU utilization – thanks to the elimination of the hypervisor layer between virtual machines and an SR-IOV-enabled SSD.

FerriSSD®: End to End Data Path Protection to Guarantee Data Integrity

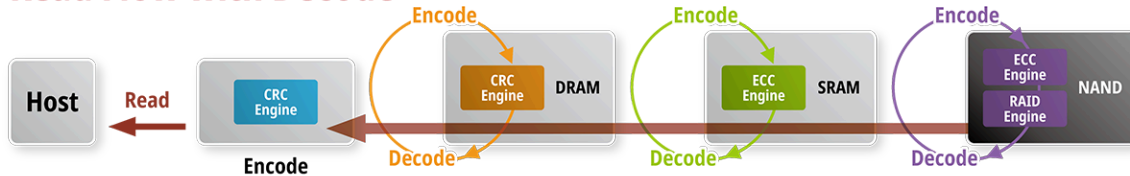
Silicon Motion's FerriSSDs incorporate full data error detection with recovery engines to provide enhanced data integrity throughout the entire Host-to-NAND-to-Host data path. The FerriSSD® data recovery algorithm can effectively detect any error in the SSD data path, including hardware (i.e. ASIC) errors, firmware errors, and memory errors arising in SRAM, DRAM, or NAND.

Write Flow with Encode



No error data will be sent to host

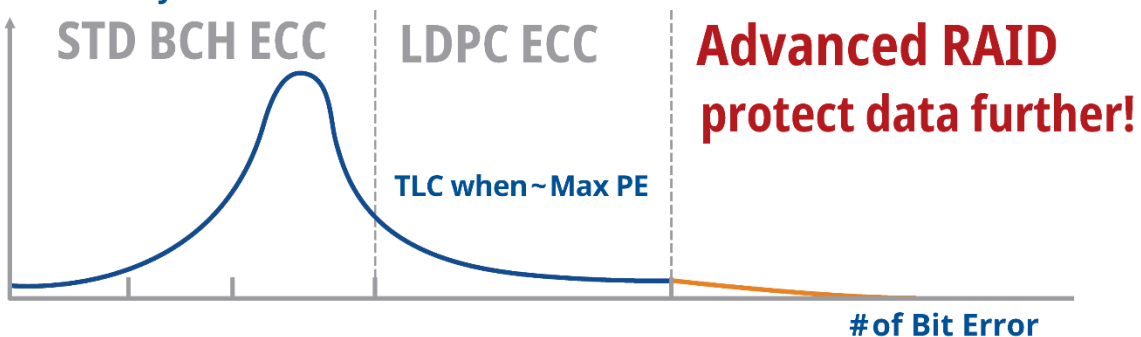
Read Flow with Decode



FerriSSD®: NANDXtend® ECC technology to Extend Operating Lifetime

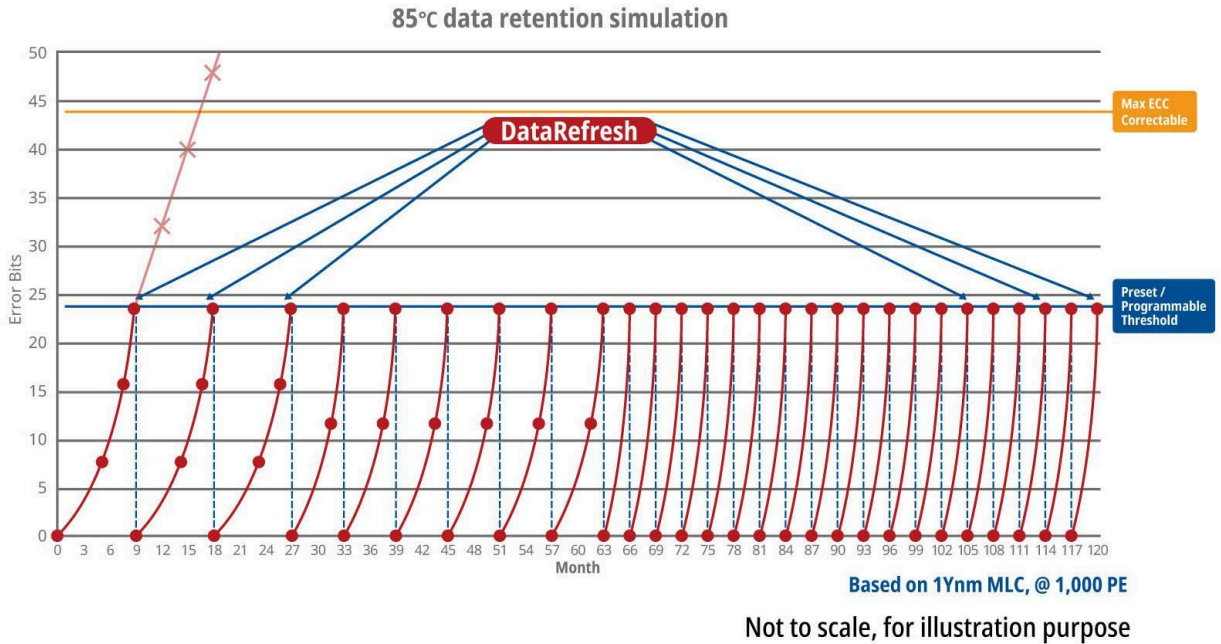
Conventional SSDs employ standard BCH and RS ECC (error correction coding) engines to initiate first-level correction using NAND shift-read-retries. In addition to this first-level error correction, FerriSSDs also implement a highly efficient second-level correction scheme using an LDPC (low-density parity-check) code and an advanced RAID algorithm (a highly efficient redundant backup) to reduce potential DPPM at customer site while extending the service life of SSD.

Probability of RBER



IntelligentScan™ and DataRefresh™ to Enhance Data Retention in High Temperature Environment

Silicon Motion's proprietary IntelligentScan function will activate automatically to scan recharge, repair or retire the cell block (DataRefresh) according to the host behavior and working environment (eg. ambient temperature). As a result of the combination of IntelligentScan and DataRefresh, Ferri-UFS® can effectively prolong its service life much beyond typical NAND specifications.



Ferri Family Enabling the NAND Flash Storage in Comprehensive Applications

Why Ferri Family

- FW & HW Customization
- Scalable Proven MP Setup
- 100% Screened for Low DPPM
- Design Service to MP Support
- Wide Temperature Support
 - Industrial Temperature
 - Commercial Temperature
 - AEC-Q100 Grade 3 / 2

Ferri

Ferri-UFS[®]

Ferri-eMMC[®]

Applications

Telecom & Server

Automotive

Medical Device

POS & Kiosk

HMI & Thin Client

Digital Signage

MEP

Gaming

Surveillance

Video



Documents

[FerriSSD® Selection Guide-Ax series PCIe Chip](#)

[FerriSSD® for Server Applications](#)

[FerriSSD® for Embedded Computing Applications](#)

[FerriSSD® Modules](#)

[Silicon Motion's Ferri Family: AEC-Q100 Qualified Embedded Storage](#)

[Silicon Motion's FerriSSD Offers the Stability and Data Security Required in Medical Equipment](#)

[Silicon Motion's PCIe NVMe FerriSSD Enables High Speed and High Reliability for Digital Signage](#)

[Silicon Motion's PCIe FerriSSD® Designed Specifically for Industrial/Embedded Applications](#)

[Silicon Motion's Ferri Family Optimizes Embedded Flash-based Storage for Automotive Use](#)

[Silicon Motion's New FerriSSD® Boosts Server Performance in a BGA-SSD](#)

[Silicon Motion FerriSSD® for Embedded Boot Load Applications](#)

Video

[Ferri Family Overview:](#)

[Automotive storage solution](#)