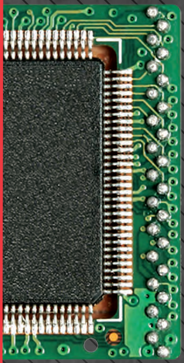
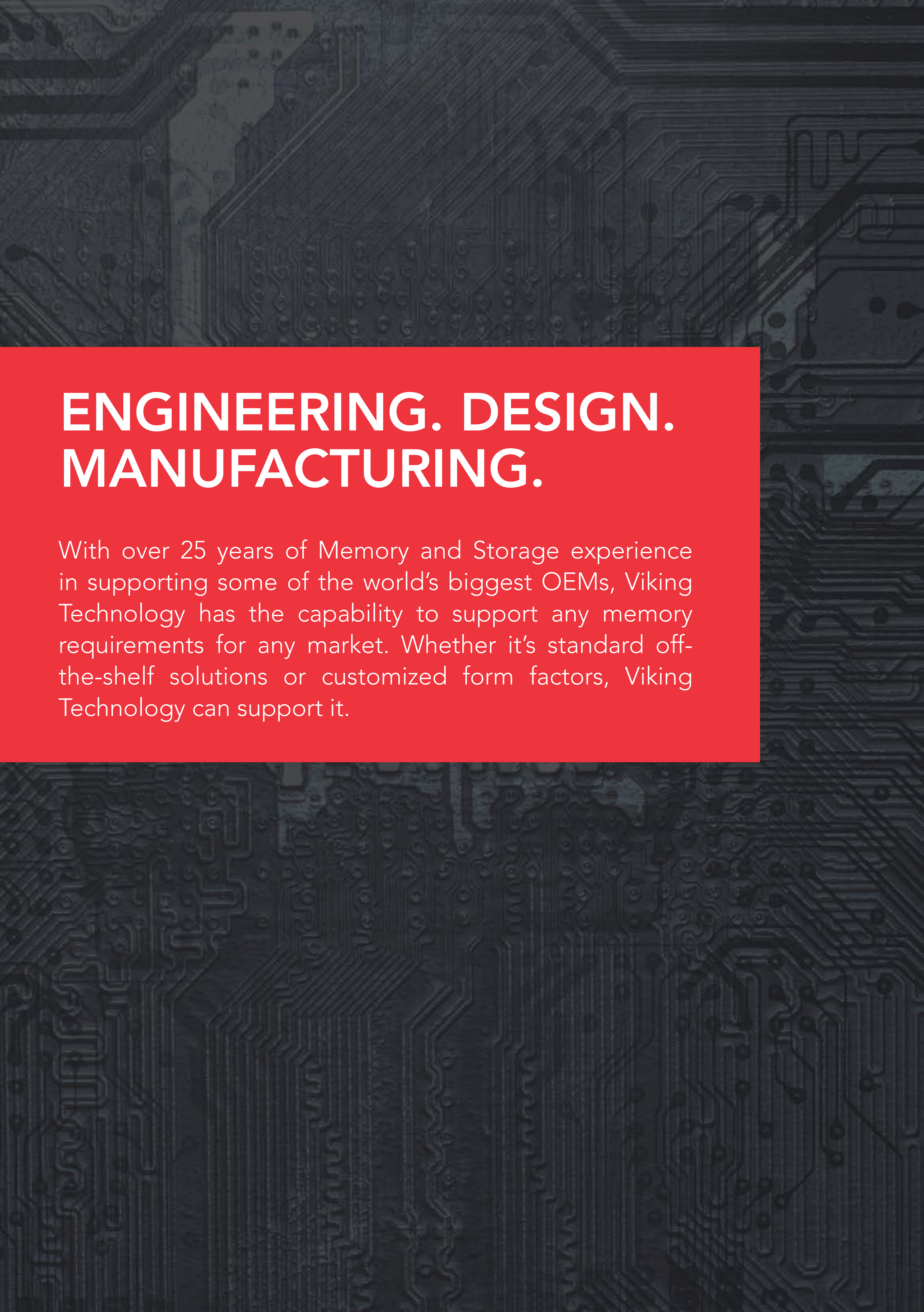
DRAM MEMORY & FLASH STORAGE

DRAM, SSD, NVDIMM, MCP & Custom Product Solutions



viking
TECHNOLOGY



ENGINEERING. DESIGN. MANUFACTURING.

With over 25 years of Memory and Storage experience in supporting some of the world's biggest OEMs, Viking Technology has the capability to support any memory requirements for any market. Whether it's standard off-the-shelf solutions or customized form factors, Viking Technology can support it.

VIKING TECHNOLOGY

Viking Technology is a global technology leader in the field of DRAM memory & Flash storage solutions ranging from high-performance computing SSDs to small form factor flash DRAM modules optimized for industrial, telecommunications, military/defense, and enterprise markets. Viking Technology broadens its technology leadership with several advanced technologies such as memory packaging, multi-chip packaging, system-in-package, and storage class memory.

Viking Technology's comprehensive memory product offerings include Enterprise Class & Industrial Grade SSDs available across a wide portfolio of standard and OEM customized form-factors (2.5", 1.8" SlimSATA, mSATA, M.2, PCIe/NVMe SSDs, SATADIMM™, Discrete Flash Cards and eUSB). Viking Technology also supports the broadest range of DDR5, DDR4, DDR3, DDR2, and custom modules; from High-Density to Small-Form Factor with Error Checking and Correction (ECC Memory).

Viking Technology also specializes in DRAM and Flash Multi-chip packaging, allowing for higher density packages optimized for the military and aerospace environments. Viking Technology's Parallel family of Packaged products are multi-chip package (MCP) solutions that are bare die and wafer level stacked, capable of reducing the overall footprint of memory modules into a single chip. These MCP solutions are military tested, defense avionics ready, with future generations optimized for radiation tolerance and space compliance.

VIKING TECHNOLOGY PRODUCT PORTFOLIO

Viking Technology's comprehensive DRAM Memory and Flash Storage product offerings include Enterprise Class, Industrial Grade, and Military optimized solutions across a wide portfolio of standard and OEM customized form-factors.

PARALLEL FAMILY OF DIE STACKED SOLUTIONS

- **ParallelCell**
  Multi-chip packaged (MCP) memory solution optimized for Military, Industrial and Embedded applications with temperature ranges of -55°C to +125°C. A full size DRAM Module in a DRAM Chip form factor.

- **Parallel SSD**
  Ultra-high density Flash NAND solutions in a NAND Chip form factor. Optimized for embedded applications, ParallelSSD supports up to 512GB of managed NAND in a 16mm x 20mm footprint.

FLASH/SSD STORAGE

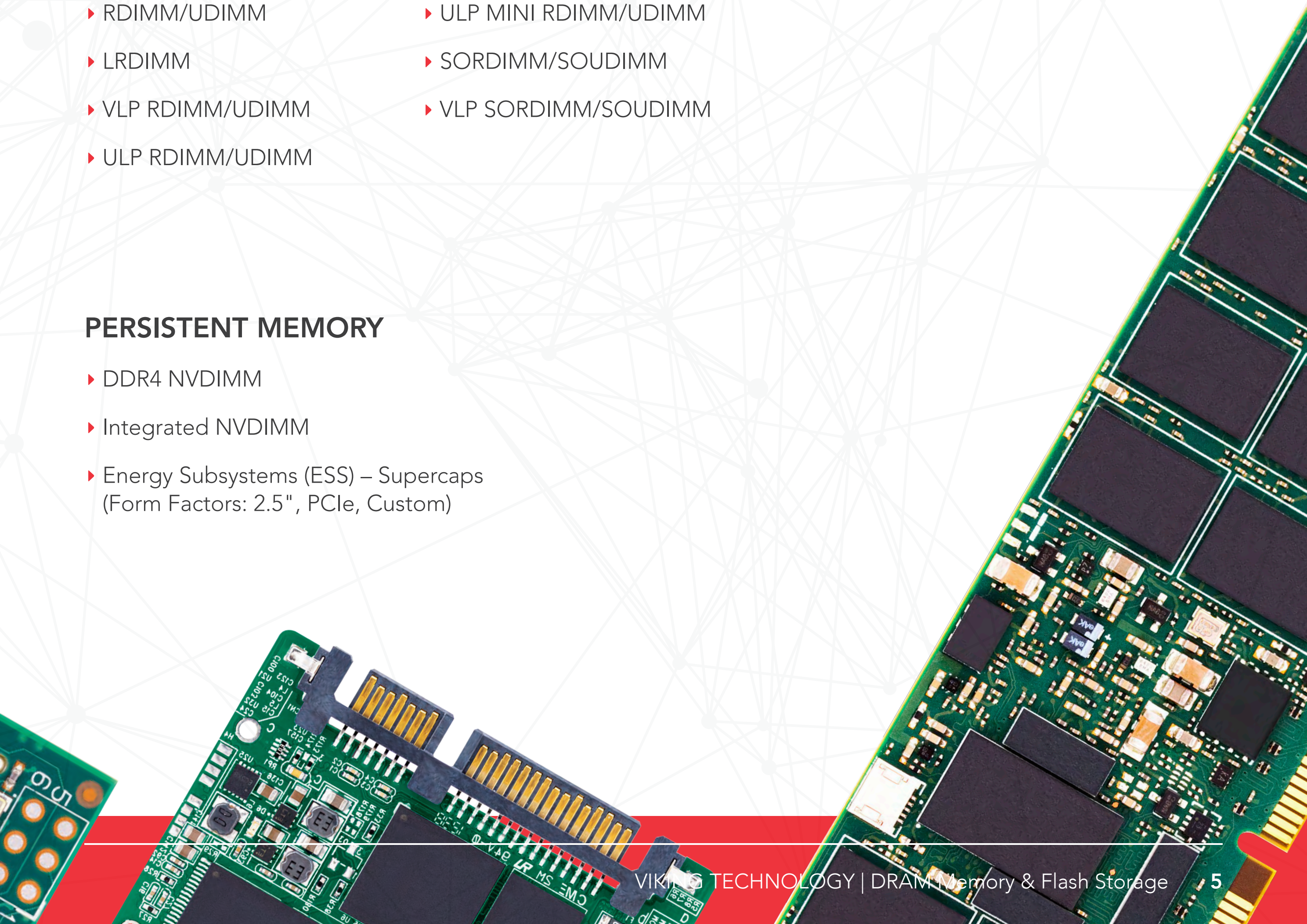
- 2.5 in. SSD
- 1.8 in. SSD
- M.2 SSD
- slimSATA
- mSATA
- eUSB
- USB Thumbdrives
- SD, microSD cards
- Custom Designs

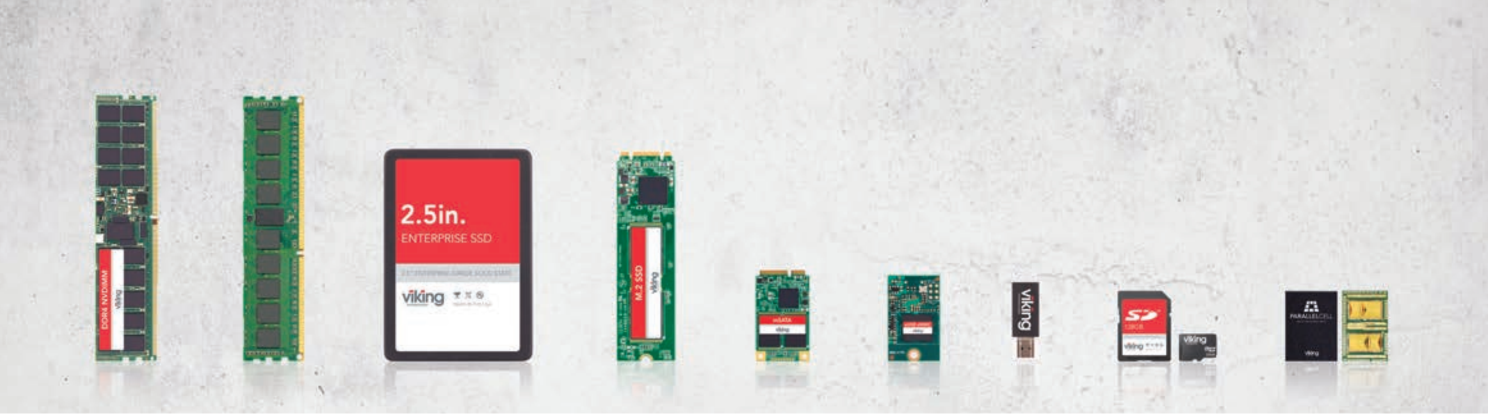
DRAM (DDR5, DDR4, DDR3, DDR2)

- Multi-Chip Package (MCP)
- RDIMM/UDIMM
- LRDIMM
- VLP RDIMM/UDIMM
- ULP RDIMM/UDIMM
- MINI RDIMM/UDIMM
- ULP MINI RDIMM/UDIMM
- SORDIMM/SOUDIMM
- VLP SORDIMM/SOUDIMM

PERSISTENT MEMORY

- DDR4 NVDIMM
- Integrated NVDIMM
- Energy Subsystems (ESS) – Supercaps
  (Form Factors: 2.5", PCIe, Custom)





DRAM	FLASH/SSD	NVDIMM/SCM ENERGY SUB-SYSTEMS	CUSTOMIZATION	MULTI-CHIP PACKAGING (MCP)
Full DRAM technology portfolio from DDR5 – Legacy DDR1	Full SSD product portfolio: 2.5”, 1.8”, mSATA, SlimSATA, M.2, eUSB, SD, microSD, USB ThumbDrives	Non-Volatile Memory Technology – Persistent Memory	Full Flash/SSD unique form factor design & engineering	High-speed DRAM Multi-chip Packaging for DDR4
Standard form factors & small form-factor	SLC, MLC, 3D NAND support	DDR4 NVDIMM-N Leader	Extended temperature support Automotive Temp (-40°C to +125°C), Military Temp (-55°C to +125°C) Support	Custom System-in-Package (SIP) solutions
Thermal and electrical stress optimization for the most challenging environments	iTemp, Ruggedization, Customization	Tethered ESS (supercap) & Integrated single module NVDIMM	Conformal coating, custom labeling & packaging	High temperature solder attach for GaN or similar devices
Patented Stacking Technology for cost effective higher density modules	SAS/PCIe/NVMe/SATA	High accuracy dispensing (<250um dots)	Extended test & customized burn-in testing	Void reduction/elimination using vacuum reflow
cTemp (0 to +70°C), iTemp (-40°C to +95°C) Support	SSD capacities up to 50TB	Driving Non-Volatile & Hybrid Module Industry Standards (JEDEC – SNIA)	Ruggedization, miniaturization & custom form factors	Higher accuracy eutectic bonding
DRAM supplier partnership: Samsung, Hynix, Micron	NAND supplier partnership: SLC & MLC from Toshiba, Micron, Samsung, Spansion, Hynix	Standard ESS 2.5in, PCIe, Fanbay	Long-term supply support (beyond LTB/LTS)	X-ray & C-SAM inspection for robustness
Specialty module & legacy module support	Controller supplier partnership: Samsung, Sandforce/ Seagate, Phison, SMI, Hyperstone	Energy Sub-System Customization		

VIKING ADVANTAGES

- Relieves burden on customer engineering resources
- In-house sustaining qualification & validations
- Advanced engineering & design
- ITAR compliant facility: Certified to ISO 9000, TL 9000 & AS 9100

ADVANCED CAPABILITIES

- Enhanced & customized testing
- Environmental stress screening
- Locked BOM
- Long-term supply support
- Conformal coated
- In-house Failure Analysis

TECHNOLOGY INNOVATIONS

- High Density DRAM (Viking Stacking Technology)
- Non Volatile DIMM (Persistent memory)
- Embedded Flash solutions (Rugged)
- Enterprise & Modular SSDs
- Extreme temperature development

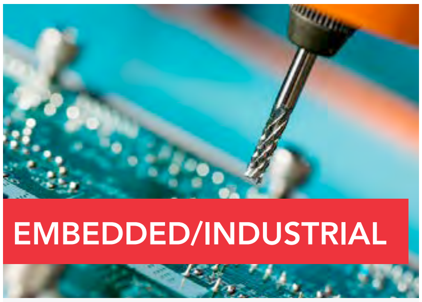
KEY MARKETS SERVED

100% OEM FOCUSED

Viking Technology’s commitment is to develop and deliver high technology products that optimize the value and performance of our customers’ applications.

TELECOMMUNICATIONS

- Substrate/package design
- Microelectronic components & materials
- Package to system interconnection
- Wide operating temperature range, conformal coating & anti-sulfur resistors components



EMBEDDED/INDUSTRIAL

- Extended Temperatures (Commerical, Industrial, & Military)
- Beyond LTB/LTS (up to 5+ years beyond)
- Package to system interconnection
- Custom Form Factors Engineering

ENTERPRISE

- Comprehensive range of DRAM modules
- Persistent memory technology
- Energy efficient solutions
- Ultra High Capacity Storage
- Zero down-time (fault tolerant)

MILITARY/AEROSPACE

- Custom development for manufacturing & customer specific test environments
- Structural, functional, system test
- Design validation – high end testing capabilities (110Ghz)

AUTOMOTIVE

- Ruggedized design for enhanced shock & vibe
- Embedded & Ultra-small form factor requirements
- Powerfail & Humidity Support
- Automotive Temperature Rated Memory & Storage

MEDICAL

- Reliability analysis, FMEA
- Custom product qualification
- Failure analysis
- Regulatory compliance

PARALLEL FAMILY

Viking Technology Parallel Family of Die Stacked solutions are part of the extreme density line of products dedicated and optimized for the embedded, military/defense, and industrial market. Designed to provide a significantly higher memory density per cubic inch, these solutions can reduce design footprints up to 85% compared to traditional DRAM and Flash modules.

These performance and density milestones will critically change the way future systems hardware are designed and deployed.

PARALLEL FAMILY OF PACKAGE SOLUTIONS

Very small footprint: Saves up to 85% board space vs. Standard DRAM & Flash Modules	Rugged: Soldered-down – No interface connectors	Ultra-high memory density per cubic in.
DRAM, NAND & System Packaged Modules	Superior signal integrity	Very high memory bandwidth per cu. in.

Ultra-Dense Line of Die-Stacked Solutions

Viking Technology's Parallel family of Packaged products are multi-chip package (MCP) and system-in-packaged (SiP) solutions that are bare die and wafer level stacked, capable of reducing the overall footprint of memory modules into a single chip. These MCP solutions are military tested, defense, and avionics ready with future generations optimized for radiation tolerant and space compliant.

PARALLELCELL

Full single rank DDR4 memory channel solution in a BGA package with data width at x72 (64 data bits plus ECC)

- Ultra-dense: 15mm x 20mm
- Up to 16GB
- Temperature range: -55°C to +125°C
- Up to 2667 MT/sec
- Reliability: 100% burn-in

PARALLELSSD

Ultra-high capacity Solid State Drive solution in a BGA package, optimized as managed NAND for embedded applications

- Ultra-dense: 16mm x 20mm
- Up to 512GB
- Temperature range: -55°C to +105°C
- Interface: SATA/NVMe
- Performance: up to 1400MB/s (read) / 650MB/s (write)

FLASH/SSD

Viking Technology offers a wide portfolio of Flash & SSD storage solutions that comes in a variety of form factors such as 2.5in, 1.8in, M.2, slimSATA, mSATA, eUSB, USB FlashDrives, SD, microSD and custom build.

As well, Viking Technology utilizes various NAND and Controller vendors to help insulate our customers against single NAND supply issues as well as price competitiveness. This also allows Viking Technology to provide the best form fit and function to each and every application.

Viking Technology's line of memory/storage solutions with extended temperature support are built with the most stringent of requirements in mind, with extreme temperature ranges, high humidity support, shock resistance, and ruggedization. Viking's extended temperature solutions ranges from standard commercial (0°C to +70°C) & industrial temperatures (-40°C to +85°C) as well as customized temperature ranges of up to +170°C.

MEASURES OF QUALITY

- MTBF calculation using the Belco remodeling method
- Real-time monitoring of field DPPM
- Weekly reviews of MRB with closed loop feedback action
- Weekly monitoring of First pass yield, RTY, scrap, in process defects
- Bi-annual CSI monitoring of all suppliers
- Quarterly SSI monitoring of all suppliers
- Environmental awareness with ISO 14000
- Corporate CSR
- Certified to ISO 9000, TL 9000 and AS 9100
- In-house reliability tools and thermal-cycle, shock chambers
- Local MIL 810 testing and certification available
- In-house Failure Analysis
- All inspectors IPC CERTIFIED
- All QE's have ASQ certifications
- In-house designed test programs

ENVIRONMENTAL/RELIABILITY

- Mil-Std-810F Test Suite
- Altitude
- High temp operating
- Low temp operating
- Humidity
- Thermal shock
- EMC
- Thermal Cycling
- Blowing dust
- Vibration
- Mechanical shock
- Acceleration
- Explosive atmosphere

FLASH/SSD EXTENDED TEMPERATURE SUPPORT

FORM FACTOR	INTERFACE	CAPACITY	TEMPERATURE SUPPORTED			
2.5 in. SSD	SAS/NVMe/PCIe	up to 15TB	Commercial			
2.5 in. SSD	SATA	up to 8TB	Commercial	Industrial	Automotive	Military
M.2 SSD	SAS/NVMe/PCIe	up to 8TB	Commercial			
M.2 SSD	SATA	up to 8TB	Commercial	Industrial		
SlimSATA/mSATA	SATA	up to 2TB	Commercial	Industrial		
eUSB	USB	up to 32GB	Commercial	Industrial	Automotive	Military
SD/microSD	SD	up to 256GB	Commercial	Industrial		
Discrete Flash Card	PATA	up to 32GB	Commercial	Industrial	Automotive	Military
USB ThumbDrive	USB	up to 256GB	Commercial	Industrial	Automotive	Military

2.5 inch SSD

Viking Technology's 2.5 Inch SSDs are built with the understanding of OEM expectations through comprehensive and exhaustive design verification and production test methods. Viking's 2.5 Inch SSDs for the embedded and Industrial market delivers the highest levels of quality, environmental ruggedness and endurance. As well, the 2.5 Inch SSDs can be leverage for the Enterprise market with engineered options for the highest levels of performance and reliability, Viking featuring multiple interfaces including SATA, SAS and PCIe/NVMe that delivers high performance with reliability.

AVAILABLE IN SATA, SAS, PCIE/NVME AND U.2

- Supports MLC/SLC/3D NAND Configurations
- Advanced SSD-specific SMART command support
- Package and firmware customization
- Locked BOM
- Data path protection, Encryption, Max Write performance

MARKETS SERVED

Data Center | HDD | Video | Telecom | Aerospace | Servers | Storage

M.2 SSD

Viking Technology's M.2 Solid State Drive (SSD) is a high-performance, high-capacity flash solution optimized for the embedded and server market. The M.2 SSD is a caseless drive with either a SATA or PCIe/NVMe connector; delivering high-bandwidth READs and WRITEs at a fraction of the size of a standard 2.5 inch SSD. The thin form factor comes in a variety of sizes best fit for the customer's system requirements.

M.2 is a new storage form factor optimized specifically for embedded solutions to increase overall performance and capacity.

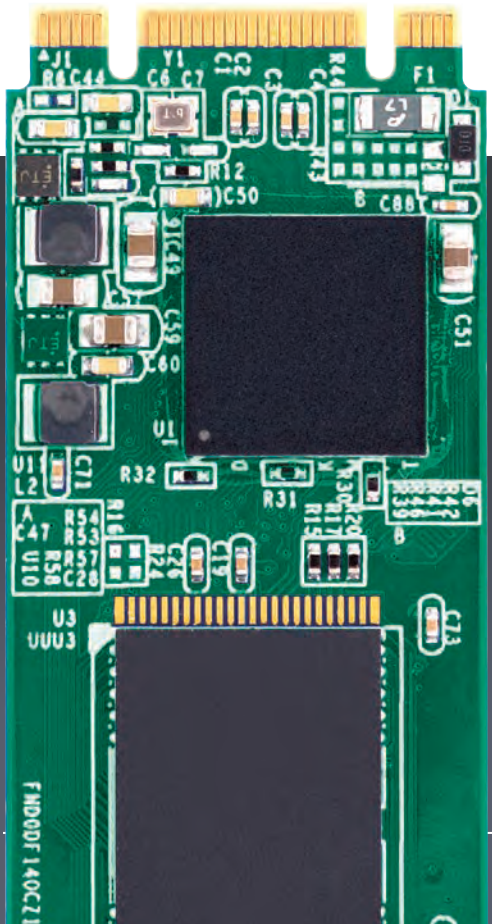
VIKING CUSTOMIZATION OPTIONS:

Client and Enterprise options
3D NAND Options and SLC

Low capacity form factor 22mm x 42mm
High capacity form factor 22mm x 110mm
Form Factor options 22mm x (42, 60, 80, 110) mm

MARKETS SERVED

Servers | POS | Cache | Industrial | Mobile | Digital Signage | Boot Device

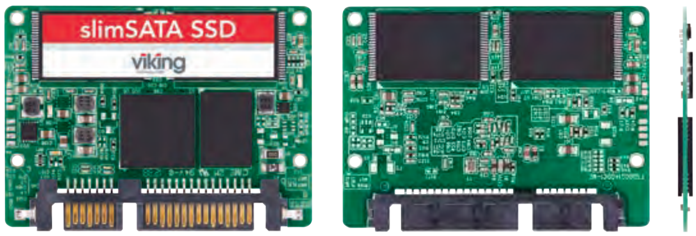


- Data path protection, Encryption, Max Write performance
- Ultra high-performance
- Advanced SSD-Specific SMART command support
- Low & High capacity form factor options

slimSATA & mSATA SSDs

slimSATA & mSATA SSD are solid state drive solutions ideal for space-constrained embedded server & storage systems, telecommunications, automotive, gaming and many industrial applications. Both solutions deliver outstanding performance in a small, industry standard form factor and features intelligent flash management techniques to optimize endurance and wear-leveling. Both drives come in a variety of performance and capacity as well as ruggedization and increased endurance.

- Available in SATA-III 6Gbs
- Read intensive & Low cost solution options
- Max write performance
- Supports MLC/SLC/3D NAND Configurations
- Advanced SSD-specific SMART command support
- Package and firmware customization
- Insulation against single NAND supply issues
- Locked BOM



MARKETS SERVED

Servers | Cache | Data Acceleration | Factory Automation | Boot Device | Medical Equipment

eUSB

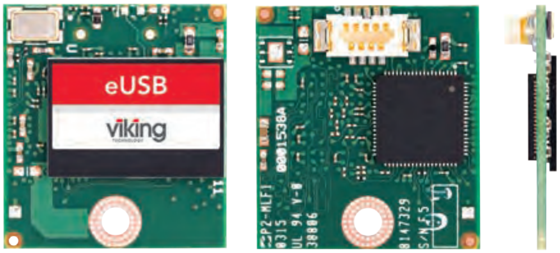
The embedded USB (eUSB) module from Viking Technology provides a rugged, reliable and cost effective non-volatile memory solution to OEM customers in the Networking, Embedded and Industrial markets. eUSB modules are secure pluggable USB 2.0/3.0 devices with built-in ECC and global wear-leveling for exceptional reliability and product lifetime. Viking eUSB modules are available in capacities up to 32GB and deliver performance up to 35 MB/s. Available in both industry standard, low profile, and custom versions, as well as 3.3V and 5V operation.

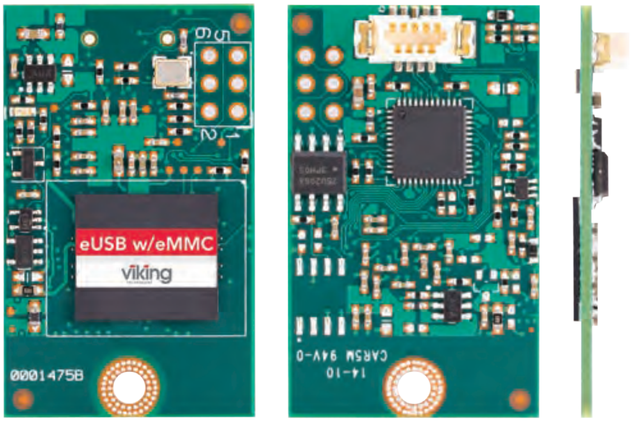
eUSB

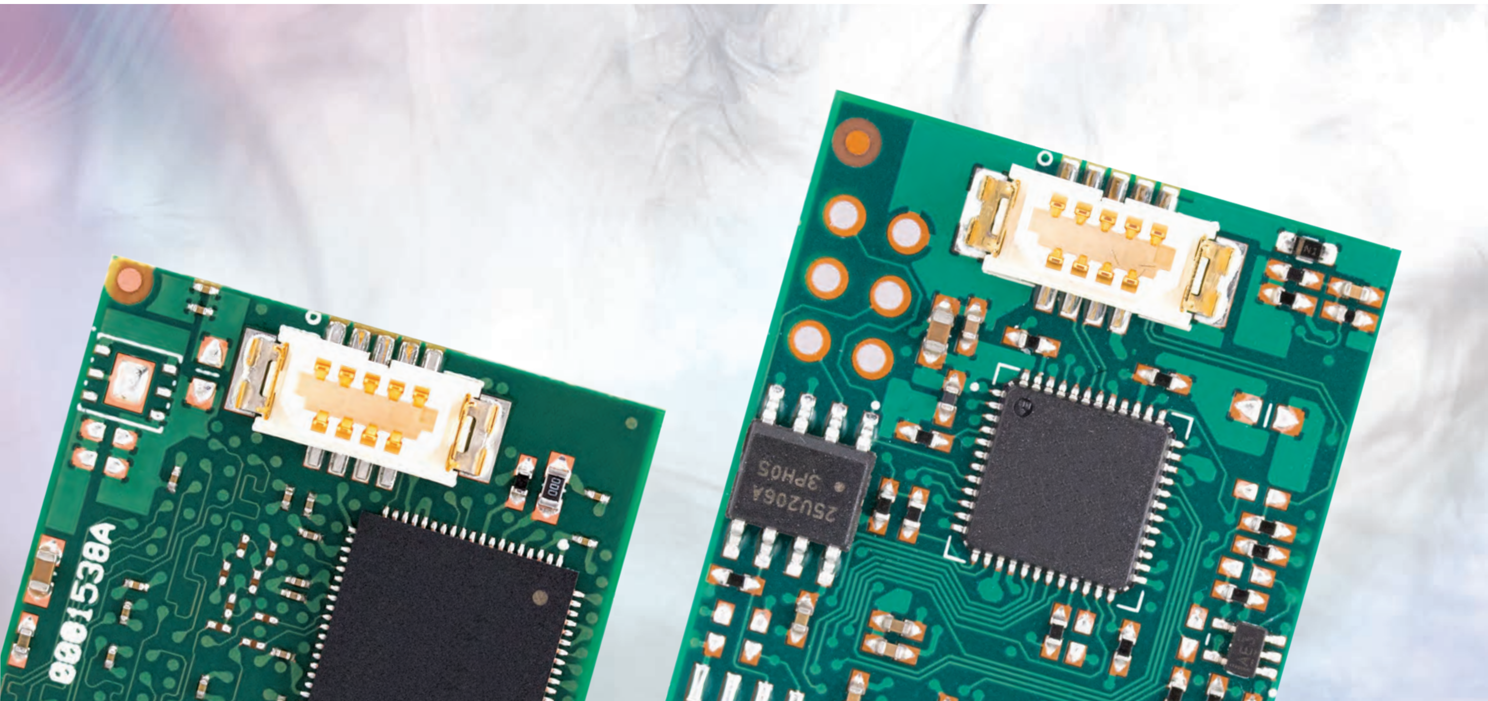
- Reduced size eUSB
- Optimized for space constraint routers/switches
- Available in iTemp & cTemp configurations
- Screw mountable for ruggedization

eUSB eMMC

- Cost effectiveness utilizing eMMC Flash
- Low-cost endurance alternative to SLC NAND
- ECC and Data Management
- Highest endurance
- Extremely low cost alternative

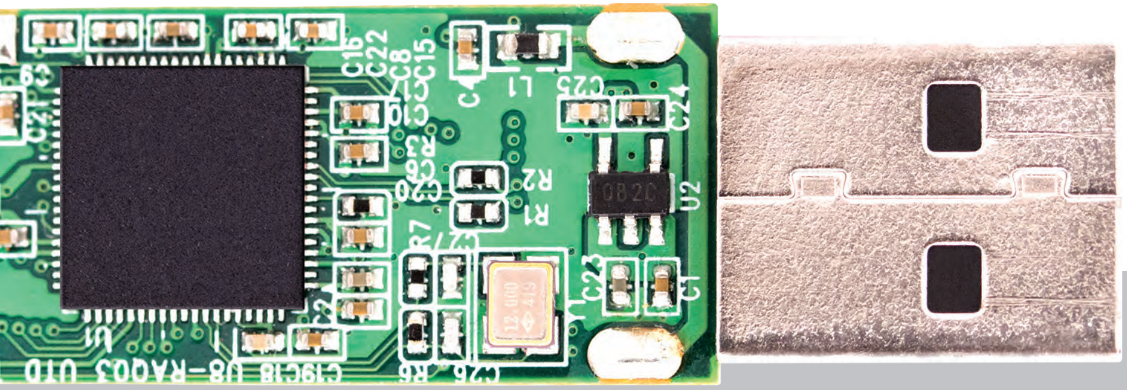






USB Thumbdrive

Viking Technology USB Thumbdrive, also known as a USB Flash Drive, is a embedded/industrial Flash storage device that includes flash memory with an integrated USB 2.0/3.0 interface. The USB Thumbdrive comes in a variety for sizes best fit for any application and space constraint systems.



- Optimized for space constraint routers/switches
- Available in iTemp & cTemp configurations
- Available in capacities up to 512GB
- Utilizes SLC/MLC/3D NAND
- Locked BOM
- Package & Firmware customization
- Conformal coated configuration

- USB 3.0 high speed compatible (supports Bulk-Only transport protocol)*
- Write Protect
- Drive Activity indicator signal (Blue LED is on when USB is active)
- Solid state, Non-volatile NAND Memory
- RoHS Compliant

**With exception of 3.3V only operation, USB specification is 5V*

MARKETS SERVED

IP Routing | Switches | Servers | Cache | Data Acceleration | Factory Automation | Medical Equipment | Boot Device | Data Logging

SD & microSD

Viking Technology Secure Digital Cards (SD) and microSD cards are powerful, highest capacity memory card that delivers maximum speed for performance, reliability, and security to the most demanding of embedded solutions. These removeable cards are optimized for the embedded market with high-shock tolerance, high-temperature configurations, and ruggedization for extreme environments.

- Capacities up to 256GB
- Superior wear leveling
- High Performance
- SD Security specs v. 2.0
- Mechanical write protection switch
- Supports commercial and industrial temperature

MARKETS SERVED

Servers | Cache | Data Acceleration | Factory Automation | Medical Equipment | Boot Device | Switches | Data Logging

DRAM

Viking Technology has over two decades of experience supporting Original Equipment Manufacturers (OEMs) with the industry's most comprehensive range of DRAM modules. Leveraging advanced packaging expertise, locked BOM control, and AS9100, TL 9000, and ISO 14001 certified facilities, Viking Technology is able to deliver the highest quality DRAM modules that meet the requirements of the Enterprise, Telecommunications and Embedded markets.

Viking Technology also specializes in Stacking Technologies that allow for ultra-high density memory modules. Viking Technology's 3rd Generation of Patented stacking, the VT-Stack™ enables OEM customers that are designing solutions with DRAM, NAND Flash or even next generation memory technologies such as ReRAM, MRAM, or PhaseChange, to optimize the performance and design cycle of their products.

DDR5, DDR4, DDR3, DDR2

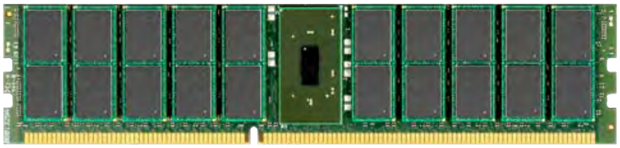
From enterprise to Embedded to network infrastructure, OEMs from around the world trust in Viking Technology's DRAM modules and technology. Viking has more than just a long history of supporting OEMs with edging lead DRAM technology but also provides its customers with legacy support. With the industry's broadest offering of standard DRAM modules, specialty modules, and small form factor modules, Viking is not only a provider of high-quality memory but a partner in DRAM technology.

RDIMM/UDIMM

DDR2, DDR3, DDR4, DDR5: 133.35mm

DDR5: 31.25mm
DDR4: 31.25mm
DDR3: 30.00mm
DDR2: 30.00mm

LRDIMM



DDR2, DDR3, DDR4: 133.35mm

DDR4: 31.25mm
DDR3: 30.00mm
DDR2: 30.00mm

VLP RDIMM/UDIMM

DDR2, DDR3, DDR4, DDR5: 133.35mm

DDR5: 18.75mm
DDR4: 18.75mm
DDR3: 18.75mm
DDR2: 18.25mm

ULP RDIMM/UDIMM

DDR2, DDR3, DDR4, DDR5: 133.35mm

DDR5: 17.78mm
DDR4: 17.78mm
DDR3: 17.78mm
DDR2: 17.78mm

THICKNESS OF ALL DIMMS: 3.98mm
STACKED MODULES: 7.55mm

MINI RDIMM/UDIMM

DDR2, DDR3: 82mm
DDR4, DDR5: 80mm

DDR5: 31.25mm
DDR4: 31.25mm
DDR3: 30.00mm
DDR2: N/A

VLP MINI RDIMM/UDIMM

DDR2, DDR3: 82mm
DDR4, DDR5: 80mm

DDR5: 18.75mm
DDR4: 18.75mm
DDR3: 18.75mm
DDR2: 18.29mm

ULP MINI RDIMM/UDIMM

DDR2, DDR3: 82mm
DDR4, DDR5: 80mm

DDR5: 17.78mm
DDR4: 17.78mm
DDR3: 17.78mm
DDR2: 17.78mm

SORDIMM/SOUDIMM

DDR2, DDR3: 67.6mm
DDR5, DDR5: 69.6mm

DDR5: 30.00mm
DDR4: 30.00mm
DDR3: 30.00mm
DDR2: 30.00mm

VLP SORDIMM/SOUDIMM

DDR2, DDR3: 67.6mm
DDR4, DDR5: 69.6mm

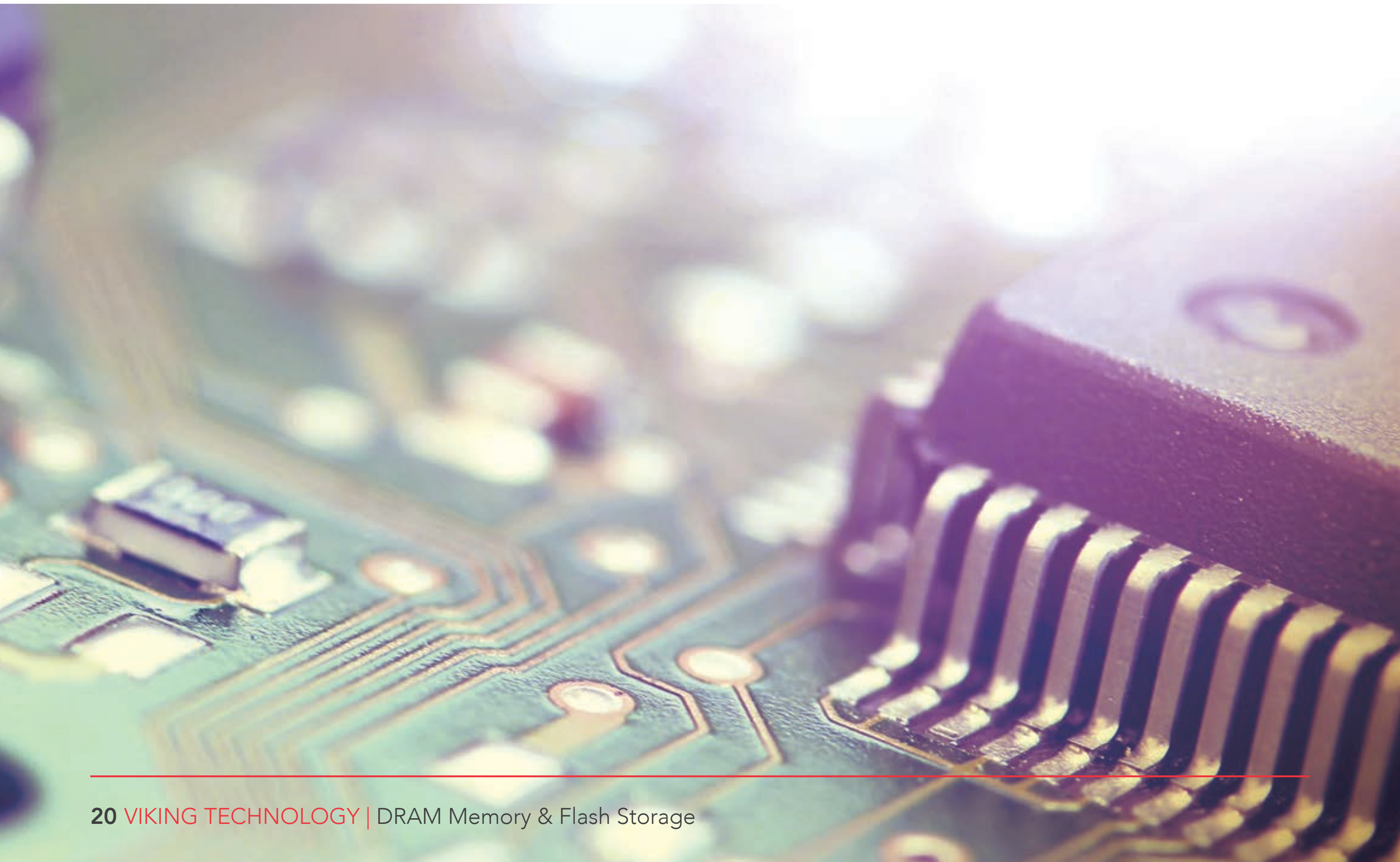
DDR5: 18.75mm
DDR4: 18.75mm
DDR3: 18.75mm
DDR2: N/A

**Please contact the company for samples and availability of additional form factor DDR5 memory modules.*

DENSITIES AND CONFIGURATIONS

- Broadest DRAM Offering
- JEDEC Standard
- Low-cost options
- Customized Testing
- Bill of Materials (BOM)
- Extended Burn-in Testing
- Thermal Modeling
- Small Form Factors
- Signal Integrity

SPECIFICATION		**DDR2**	**DDR3**	**DDR4**	**DDR5**
CHIP DENSITY	Min	512MB	1GB	4GB	16GB
	Max	2GB*	8GB*	32GB	–
MODULE DENSITY	Max	16GB	64GB	128GB	32GB
SPEED	Slowest	400MT/s	800MT/s	1600MT/s	4800MT/s
	Fastest	800MT/s	1866MT/s	2666MT/s	–
PACKAGE	Package	FBGA	FBGA	FBGA	FBGA



EXTENDED TEMPERATURE MEMORY & STORAGE SOLUTIONS

Viking Technology's line of memory/storage solutions with extended temperature support are built with the most stringent of requirements in mind, with extreme temperature ranges, high humidity support, shock resistance, and ruggedization. Viking's extended temperature solutions ranges from standard commercial (0°C to +70°C) & industrial temperatures (-40°C to +95°C) as well as customized temperature ranges of up to +170°C. These extended temperature solutions can be found in applications used in mountainous regions to deserts and even in arctic conditions for Oil and Gas down-hole drilling. Beyond the temperature ranges, each solution can be customized as a ruggedized memory/storage device built to resist larger amounts of shock and vibrations. These solutions offer the utmost in performance and reliability in challenging, real-world conditions.

DRAM EXTENDED TEMPERATURE SUPPORT

FORM FACTOR	DDR5	DDR4	DDR3	DDR2
LRDIMM	NA	up to 256GB	up to 64GB	up to 16GB
RDIMM	up to 256GB	up to 256GB	up to 32GB	up to 8GB
UDIMM	up to 32GB	up to 128GB	up to 16GB	up to 8GB
VLP RDIMM	up to 32GB	up to 32GB	up to 32GB	up to 4GB
VLP UDIMM	up to 32GB	up to 32GB	up to 16GB	up to 8GB
ULP RDIMM	up to 32GB	up to 16GB	up to 16GB	up to 8GB
MiniRDIMM	up to 32GB	up to 16GB	up to 16GB	up to 4GB
MiniUDIMM	up to 32GB	up to 16GB	up to 16GB	up to 4GB
VLP MiniRDIMM	up to 16GB	up to 16GB	up to 16GB	up to 4GB
VLP MiniUDIMM	up to 16GB	up to 16GB	up to 8GB	NA
ULP MiniRDIMM	up to 16GB	up to 16GB	up to 8GB	NA
ULP MiniUDIMM	up to 16GB	up to 16GB	up to 8GB	up to 4GB
SORDIMM	up to 32GB	up to 32GB	up to 16GB	up to 4GB
SOUDIMM	up to 32GB	up to 32GB	up to 16GB	up to 4GB
SOCDIMM	NA	NA	NA	NA
VLP SORDIMM	up to 16GB	up to 16GB	up to 8GB	
TEMPERATURE RANGE				
	Commercial	Commercial	Commercial	Commercial
	Industrial	Industrial	Industrial	Industrial
	Automotive	Automotive		
	Military	Military		

COMMERCIAL	INDUSTRIAL	AUTOMOTIVE	MILITARY
(0°C to +70°C)	(-40°C to +95°C)	(-40°C to +105°C)	(-55°C to +125°C)

PERSISTENT MEMORY

Viking Technology has a strong legacy in developing Persistent Memory solutions over several generations of products; ranging from Non-Volatile DIMMs (NVDIMMs) to persistent drive form factor solutions with DRAM enablement.

These persistent solutions are delivering the key components to enterprise customers looking to enable the next generation of computing and storage architectures.

DDR4 NVDIMM

Viking's (NVDIMM) DDR4 Non-Volatile DIMM, delivers both performance and reliability to enterprise applications. This non-volatile memory module has been designed to be integrated into Intel's new NVDIMM enabled servers via DDR4 DIMM sockets and designed to preserve critical data in the event of a power or system failure. Viking's NVDIMM enables the host system to recover from a failure event with simplicity and ease.

NVDIMM – N

Memory mapped DRAM with no system access to flash.

- Low-Capacity (2GB - 32GB)
- Very-low Latency (10s of nanoseconds)

INTEGRATED NVDIMM

Supercap is now integrated on the NVDIMM module itself along with other components.

Ease of Integration

- No need to worry about Supercap mounting schemes or loss of precious chassis space
- No issues installing standard DIMMs or NVDIMMs adjacent to slots hosting integrated NVDIMM
- Sufficient Airflow between adjacent modules
- Integrated NVDIMM is qualified to meet the operating temperature range of 10°C - 50°C

NVDIMM Energy Sub-System (ESS)

The NVDIMM is a DDR4 Non-Volatile DIMM enabled by an energy subsystem (ESS) which provides enough power to the module in an event of power-loss to safely store all mission critical data. Viking's ESS modules come in a variety of standard & custom form factors from 2.5in, PCIe, FanBay and special builds, with or without casing. As well, Viking Technology has the ability to customize any ESS to fit within any customer server/storage appliance.

VIKING TECHNOLOGY
A DIVISION OF SANMINA CORPORATION

GLOBAL
Customer Connected

MATURE
Developed Over 25 Years

COMPLETE SYSTEM
Consistently Deployed

1200+ CUSTOMERS
Diverse Customer Base

30,000+ SUPPLIERS
Integrated

- Founded in 1980 in San Jose, California
- Global footprint: 73 facilities in 20 countries, 6 continents
- $7.33B revenue (ttm)
- 35,000 employees

WELCOME TO THE SANMINA FAMILY

Sanmina makes some of the most complex and innovative optical, electronic and mechanical products in the world. Recognized as a technology leader, Sanmina provides end-to-end design, manufacturing and logistics solutions, delivering superior quality and support to Original Equipment Manufacturers (OEMs) primarily in the communications networks, computing and storage, medical, defense and aerospace, industrial and semiconductor, multimedia, automotive and clean technology sectors.

Sanmina maintains a network of regional design, quick turn, New Product Introduction (NPI) facilities and repair centers, in addition to a complete global footprint of manufacturing operations in 23 countries on six continents. Each day, in every region of the world, Sanmina designs, manufactures ships and repairs complex, mission-critical products. For over 30 years, customers have come to expect quality, delivery, reliability and service from Sanmina. Together we build productive relationships based on exceptional customer satisfaction.

Viking Technology is proud to be part of the Sanmina family, with a globally recognized name in technology and trusted partner in all of manufacturing.

END-TO-END SERVICES

ADVANCED TECHNOLOGY FOR COMPLEX PRODUCTS

ENGINEERING AND NPI CAPABILITIES

STRONG LIQUIDITY & FINANCIALS

FLASH/SSD PART NUMBERS

FORM FACTOR	INTERFACE	TEMP	CAPACITY	VIKING PN#	CONTROLLER	NAND
1.8" SATA	5mm	-40°C to+85°C	120	VRFS11120GEI2WK5	SM2259	Kioxia BiCS 5
1.8" SATA	5mm	-40°C to+85°C	240	VRFS11240GEI2WK5	SM2259	Kioxia BiCS 5
1.8" SATA	5mm	-40°C to+85°C	480	VRFS11480GEI2WK5	SM2259	Kioxia BiCS 5
1.8" SATA	5mm	-40°C to+85°C	960	VRFS11960GEIJWK5	SM2259	Kioxia BiCS 5
1.8" SATA	5mm	-40°C to+85°C	1920	VRFS111T92EIKWK5	SM2259	Kioxia BiCS 5
2.5" PCIe	7mm	0°C to+70°C	6400	VSFN256T40YC8WSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	3200	VSFN253T20YC4WSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	1600	VSFN251T60YC4WSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	960	VSFN22960GHCLWSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	7680	VSFN227T68HC8WSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	3840	VSFN223T84HC8WSA	Samsung	Samsung
2.5" PCIe	7mm	0°C to+70°C	1920	VSFN221T92HCLWSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	960	VSF225960G4CFWSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	7680	VSF2257T684C8WSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	3840	VSF2253T844C8WSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	30720	VSF22530T74C8WSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	1920	VSF2251T924C4WSA	Samsung	Samsung
2.5" SAS	15mm	0°C to+70°C	15360	VSF22515T34C8WSA	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	960	VSFS22960GFCLWSAE	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	7680	VSFS227T68FC8WSAE	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	480	VSFS22480GFCFWSAE	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	3840	VSFS223T84FCLWSAE	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	240	VSFS22240GFCFWSAE	Samsung	Samsung
2.5" SATA	7mm	0°C to+70°C	1920	VSFS221T92FCLWSAE	Samsung	Samsung
2.5" SATA	7mm	-40°C to+85°C	120	VRFS22120GEI2WK5	SM2259	Kioxia BiCS 5
2.5" SATA	7mm	-40°C to+85°C	240	VRFS22240GEI2WK5	SM2259	Kioxia BiCS 5
2.5" SATA	7mm	-40°C to+85°C	480	VRFS22480GEI2WK5	SM2259	Kioxia BiCS 5
2.5" SATA	7mm	-40°C to+85°C	960	VRFS22960GEIJWK5	SM2259	Kioxia BiCS 5
2.5" SATA	7mm	-40°C to+85°C	1920	VRFS221T92EILWK5	SM2259	Kioxia BiCS 5
eMMC	eMMC	0°C to+70°C	8	VSFEMMC8192CWSF	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	256	VSFEMMC256GCC1	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	128	VSFEMMC128GCC1	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	64	VSFEMMC064GCC1	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	32	VSFEMMC032GCCD	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	32	VSFEMMC032GCC1	Samsung	Samsung
eMMC	eMMC	0°C to+70°C	16	VSFEMMC016GCCD	Samsung	Samsung
eUSB	USB 2.0	0°C to+70°C	8	VRFDUC38192ZCD3	eMMC	eMMC
eUSB Low Profile	USB 2.0	0°C to+70°C	4	VRFDUC3L4096ZCW3	eMMC	eMMC
eUSB	USB 3.0	0°C to+70°C	4	VRFDUC44096FCFTH	Hyperstone U9	TSB 24nmSLC
eUSB	USB 3.0	-40°C to+85°C	4	VRFDUC44096FIFTH	Hyperstone U9	TSB 24nm SLC
eUSB	USB 3.0	0°C to+70°C	8	VRFDUC48192FCQTH	Hyperstone U9	TSB 24nm SLC
eUSB	USB 3.0	-40°C to+85°C	8	VRFDUC48192FIQTH	Hyperstone U9	TSB 24nm SLC
eUSB	USB 3.0	-40°C to+85°C	16	VRFDUC4016GFIR3TH	Hyperstone U9	TSB 24nm SLC
eUSB	USB 3.0	0°C to+70°C	16	VRFDUC4016GFCR3TH	Hyperstone U9	TSB 24nm SLC
eUSB	USB 2.0	0°C to+70°C	16	VRFDUC3016GKCR3TH	Hyperstone U8B	TSB 24nm SLC
eUSB	USB 2.0	-40°C to+85°C	16	VRFDUC3016GKIR3TH	Hyperstone U8B	TSB 24nm SLC
eUSB	USB 2.0	0°C to+70°C	8	VRFDUC38192KCQ3TH	Hyperstone U8B	TSB 24nm SLC
eUSB	USB 2.0	-40°C to+85°C	8	VRFDUC38192KIQ3TH	Hyperstone U8B	TSB 24nm SLC

FLASH/SSD PART NUMBERS

FORM FACTOR	INTERFACE	TEMP	CAPACITY	VIKING PN#	CONTROLLER	NAND
eUSB Low Profile	USB2.0	0°C to+70°C	16	VRFDUC3L016GKCR3TH	Hyperstone U8B	TSB 24nm SLC
eUSB Low Profile	USB2.0	-40°C to+85°C	16	VRFDUC3L016GKIR3TH	Hyperstone U8B	TSB 24nm SLC
eUSB Low Profile	USB2.0	0°C to+70°C	8	VRFDUC3L8192KCQ3TH	Hyperstone U8B	TSB 24nm SLC
eUSB Low Profile	USB2.0	-40°C to+85°C	8	VRFDUC3L8192KIQ3TH	Hyperstone U8B	TSB 24nm SLC
M.2 PCIe	2280	-40°C to+85°C	240	VPFNP5240G5IJWK5	PS5012-E12	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	480	VPFNP5480G5IJWK5	PS5012-E12	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	960	VPFNP5960G5IKWK5	PS5012-E12	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	1920	VPFNP51T925ILWK5	PS5012-E12	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	128	VPFNP5128G8I2WK5	PS5013-E13T	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	256	VPFNP5256G8IJWK5	PS5013-E13T	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	512	VPFNP5512G8IJWK5	PS5013-E13T	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	1TB	VPFNP5001T8IKWK5	PS5013-E13T	Kioxia BiCS 5
M.2 PCIe	2280	-40°C to+85°C	2TB	VPFNP5002T8ILWK5	PS5013-E13T	Kioxia BiCS 5
M.2 SATA	2260	-40°C to+85°C	120	VRFEM4120GEI2WK5	SM2259	Kioxia BiCS 5
M.2 SATA	2260	-40°C to+85°C	240	VRFEM4240GEIJWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2260	-40°C to+85°C	480	VRFEM4480GEIJWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2260	-40°C to+85°C	960	VRFEM4960GEILWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2280	-40°C to+85°C	120	VRFEM5120GEI2WK5	SM2259	Kioxia BiCS 5
M.2 SATA	2280	-40°C to+85°C	240	VRFEM5240GEI2WK5	SM2259	Kioxia BiCS 5
M.2 SATA	2280	-40°C to+85°C	480	VRFEM5480GEIJWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2280	-40°C to+85°C	960	VRFEM5960GEIKWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2280	-40°C to+85°C	1920	VRFEM51T92EILWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2242	-40°C to+85°C	120	VRFEM6120GEI2WK5	SM2259	Kioxia BiCS 5
M.2 SATA	2242	-40°C to+85°C	240	VRFEM6240GEIJWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2242	-40°C to+85°C	480	VRFEM6480GEIKWK5	SM2259	Kioxia BiCS 5
M.2 SATA	2242	-40°C to+85°C	960	VRFEM6960GEILWK5	SM2259	Kioxia BiCS 5
mSATA	MO300	-40°C to+85°C	120	VRFEM2120GEI2WK5	SM2259	Kioxia BiCS 5
mSATA	MO300	-40°C to+85°C	240	VRFEM2240GEI2WK5	SM2259	Kioxia BiCS 5
mSATA	MO300	-40°C to+85°C	480	VRFEM2480GEI2WK5	SM2259	Kioxia BiCS 5
mSATA	MO300	-40°C to+85°C	960	VRFEM2960GEIJWK5	SM2259	Kioxia BiCS 5
mSATA	MO300	-40°C to+85°C	1920	VRFEM21T92EILWK5	SM2259	Kioxia BiCS 5
SD Card	microSD	0°C to+70°C	32	VWUSD032GCEBMML	WD	SanDisk MLC
SD Card	microSD	-25°C to+85°C	256	VWFUSD256GCECMWL	WD	SanDisk MLC
SD Card	microSD	-25°C to+85°C	128	VWFUSD128GCEZMWL	WD	SanDisk MLC
SD Card	microSD	-25°C to+85°C	64	VWFUSD064GCEAMWL	WD	SanDisk MLC
SD Card	Full Size SD	-40°C to+85°C	128	VWFSD3128GCIZMWL	WD	SanDisk MLC
SD Card	Full Size SD	-25°C to+85°C	128	VWFSD3128GCEZMWL	WD	SanDisk MLC
SD Card	Full Size SD	-40°C to+85°C	64	VWFSD3064GCIAMWL	WD	SanDisk MLC
SD Card	Full Size SD	-25°C to+85°C	64	VWFSD3064GCEAMWL	WD	SanDisk MLC
SD Card	Full Size SD	-25°C to+85°C	64	VAFSD3064GCC5MTL	SMI3268	SanDisk MLC
SD Card	Full Size SD	-25°C to+85°C	32	VAFSD3032GCCBMTL	SMI3268	SanDisk MLC
slimSATA	MO297	-40°C to+85°C	120	VRFEM1120GEI2WK5	SM2259	Kioxia BiCS 5
slimSATA	MO297	-40°C to+85°C	240	VRFEM1240GEI2WK5	SM2259	Kioxia BiCS 5
slimSATA	MO297	-40°C to+85°C	480	VRFEM1480GEIJWK5	SM2259	Kioxia BiCS 5
slimSATA	MO297	-40°C to+85°C	960	VRFEM1960GEIKWK5	SM2259	Kioxia BiCS 5
slimSATA	MO297	-40°C to+85°C	1920	VRFEM11T92EILWK5	SM2259	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	32	VRFPSS032G6I1WW4	SM619	Kioxia BiCS 4
ParallelSSD SATA	FBGA	-40°C to+85°C	64	VRFPSS064G6I2WW5	SM619	Kioxia BiCS 5

FLASH/SSD PART NUMBERS

FORM FACTOR	INTERFACE	TEMP	CAPACITY	VIKING PN#	CONTROLLER	NAND
ParallelSSD SATA	FBGA	-40°C to+85°C	128	VRFPSS128G6I2WW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	256	VRFPSS256G6I2WW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	512	VRFPSS512G6I2WW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	10	VRFPSS010G6I1PW4	SM619	Kioxia BiCS 4
ParallelSSD SATA	FBGA	-40°C to+85°C	20	VRFPSS020G6I2PW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	40	VRFPSS040G6I2PW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	80	VRFPSS080G6I2PW5	SM619	Kioxia BiCS 5
ParallelSSD SATA	FBGA	-40°C to+85°C	160	VRFPSS160G6I2PW5	SM619	Kioxia BiCS 5

DDR5 PART NUMBERS

FORM FACTOR	BUFFERING	DENSITY	ORG.	SPEED	ECC	DRAM I/O	RANK	PROFILE	PART NUMBER
288-pin DIMM	Unbuffered	16GB	2Gbx64	4800MT/s	None	x8	1	LP	VR2MU2G6418KBASB
288-pin DIMM	Unbuffered	32GB	4Gbx64	4800MT/s	None	x8	2	LP	VR2MU4G6418KBASB
288-pin DIMM	Unbuffered	16GB	2Gbx72	4800MT/s	ECC	x8	1	LP	VR2MU2G7218KBASB
288-pin DIMM	Unbuffered	32GB	4Gbx72	4800MT/s	ECC	x8	2	LP	VR2MU4G7218KBASB
262-pin SODIMM	Unbuffered	16GB	2Gbx64	4800MT/s	None	x8	1	LP	VR2FU2G6418KBASB
262-pin SODIMM	Unbuffered	32GB	4Gbx64	4800MT/s	None	x8	2	LP	VR2FU4G6418KBASB
262-pin SODIMM	Unbuffered	16GB	2Gbx72	4800MT/s	ECC	x8	1	LP	VR2FU2G7218KBASB
262-pin SODIMM	Unbuffered	32GB	4Gbx72	4800MT/s	ECC	x8	2	LP	VR2FU4G7218KBASB

DDR4 PART NUMBERS

FORM FACTOR	BUFFERING	DENSITY	ORG.	SPEED	ECC	DRAM I/O	RANK	PROFILE	PART NUMBER
288-pin VLP DIMM	Registered	8GB	1Gx72	2400MT/s	ECC	x4	1	VLP	VR9VR1G7224HBJ
288-pin VLP DIMM	Registered	16GB	2Gx72	2400MT/s	ECC	x4	1	VLP	VR9VR2G7224JBJ
288-pin VLP DIMM	Registered	32GB	4Gx72	2400MT/s	ECC	x4	1	VLP	VR9VR4G7224JHJ
288-pin VLP DIMM	Registered	16GB	2Gx72	2667MT/s	ECC	x4	1	VLP	VR9VR2G7224JBK
288-pin VLP DIMM	Registered	64GB	8Gbx72	2133MT/s	ECC	x4	4	VLP	VR9VR8G7224JJH
288-pin VLP DIMM	Registered	8GB	1Gx72	2133MT/s	ECC	x8	1	VLP	VR9VR1G7228HBH
288-pin VLP DIMM	Registered	8GB	1Gx72	2133MT/s	ECC	x8	2	VLP	VR9VR1G7228HBH
288-pin VLP DIMM	Registered	16GB	2Gx72	2667MT/s	ECC	x8	2	VLP	VR9VR2G7228JBK
260 – pin VLP SODIMM	Unbuffered	8GB	1Gbx72	2133MT/s	ECC	x8	1	VLP	VR9YU1G7228JBH
260 – pin VLP SODIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	1	VLP	VR9YU1G7228JBJ
240-pin 17.75mm ULP DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x8	2	ULP	VR9UR2G7228JBH
288-pin Mini-DIMM	Registered	16GB	2Gx72	2400MT/s	ECC	x8	2	LP	VR9JR2G7228JBJ
288-pin Mini-DIMM	Unbuffered	16GB	2Gx72	2667MT/s	ECC	x8	2	LP	VR9JU2G7228JBK
288-pin ULP MINI-DIMM	Unbuffered	8GB	1Gbx72	2133MT/s	ECC	x8	1	ULP	VR9ZU1G7228JBH
288-pin ULP MINI-DIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	1	ULP	VR9ZU1G7228JBJ
244/288-pin VLP Mini-DIMM	Unbuffered	8GB	1Gx72	2133MT/s	ECC	x8	1	VLP	VR9WU1G7228JBH
244/288-pin VLP Mini-DIMM	Unbuffered	8GB	1Gx72	2400MT/s	ECC	x8	1	VLP	VR9WU1G7228JBJ
244/288-pin VLP Mini-DIMM	Unbuffered	16GB	2Gx72	2133MT/s	ECC	x8	2	VLP	VR9WU2G7228JHH
260-pin SODIMM	Registered	8GB	1Gx72	2667MT/s	ECC	x8	1	LP	VR9FR1G7228JBK
260-pin SODIMM	Registered	16GB	2Gx72	2667MT/s	ECC	x8	2	LP	VR9FR2G7228JBK
260-pin SODIMM	Unbuffered	2GB	256Mx72	2400MT/s	ECC	x16	1	LP	VR9FU567226HBJ
260-pin SODIMM	Unbuffered	4GB	512Mbx64	2133MT/s	None	x8	1	LP	VR9FU126428HBH
260-pin SODIMM	Unbuffered	4GB	512Mbx72	2133MT/s	ECC	x8	1	LP	VR9FU127228HBH

DDR4 PART NUMBERS

FORM FACTOR	BUFFERING	DENSITY	ORG.	SPEED	ECC	DRAM I/O	RANK	PROFILE	PART NUMBER
260-pin SODIMM	Unbuffered	8GB	1Gbx64	2133MT/s	None	x8	1	LP	VR9FU1G6428JBH
260-pin SODIMM	Unbuffered	8GB	1Gx72	2133MT/s	ECC	x8	1	LP	VR9FU1G7228JBH
260-pin SODIMM	Unbuffered	4GB	512Mbx64	2400MT/s	None	x8	1	LP	VR9FU126428HBJ
260-pin SODIMM	Unbuffered	4GB	512Mbx72	2400MT/s	ECC	x8	1	LP	VR9FU127228HBJ
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	1	LP	VR9FU1G7228JBJ
260-pin SODIMM	Unbuffered	8GB	1Gx64	2400MT/s	None	x8	1	LP	VR9FU1G6428JBJ
260-pin SODIMM	Unbuffered	8GB	1Gbx64	2667 MT/s	None	x8	1	LP	VR9FU1G6428JBK
260-pin SODIMM	Unbuffered	4GB	512Mbx72	2667MT/s	ECC	x8	1	LP	VR9FU127228HBK
260-pin SODIMM	Unbuffered	4GB	512Mbx64	2667MT/s	None	x8	1	LP	VR9FU126428HBK
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2667MT/s	ECC	x8	1	LP	VR9FU1G7228JBK
260-pin SODIMM	Unbuffered	8GB	1Gbx64	2133MT/s	None	x8	2	LP	VR9FU1G6428HBH
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2133MT/s	ECC	x8	2	LP	VR9FU1G7228HBH
260-pin SODIMM	Unbuffered	16GB	2Gbx64	2133MT/s	None	x8	2	LP	VR9FU2G6428JBH
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2133MT/s	ECC	x8	2	LP	VR9FU2G7228JBH
260-pin SODIMM	Unbuffered	8GB	1Gbx64	2400MT/s	None	x8	2	LP	VR9FU1G6428HBJ
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	2	LP	VR9FU1G7228HBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx64	2400MT/s	None	x8	2	LP	VR9FU2G6428JBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2400MT/s	ECC	x8	2	LP	VR9FU2G7228JBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx64	2667MT/s	None	x8	2	LP	VR9FU2G6428JBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2667MT/s	ECC	x8	2	LP	VR9FU2G7228JBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2933MT/s	ECC	x8	2	LP	VR9FU2G7228JBS
260-pin SODIMM	Unbuffered	32GB	4Gbx72	2933MT/s	ECC	x8	2	LP	VR9FU4G7228KBK
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	1	LP	VR9FU1G7228JBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2400MT/s	ECC	x8	1	LP	VR9FU2G7228KBJ
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2667MT/s	ECC	x8	1	LP	VR9FU1G7228JBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2667MT/s	ECC	x8	1	LP	VR9FU2G7228KBK
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2933MT/s	ECC	x8	1	LP	VR9FU1G7228JBS
260-pin SODIMM	Unbuffered	8GB	1Gbx72	3200MT/s	ECC	x8	1	LP	VR9FU1G7228JBP
260-pin SODIMM	Unbuffered	16GB	2Gbx72	3200MT/s	ECC	x8	1	LP	VR9FU2G7228KBP
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2133MT/S	ECC	x8	2	LP	VR9FU1G7228HBH
260-pin SODIMM	Unbuffered	8GB	1Gbx72	2400MT/s	ECC	x8	2	LP	VR9FU1G7228HBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2400MT/s	ECC	x8	2	LP	VR9FU2G7228JBJ
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2400MT/s	ECC	x8	2	LP	VR9FU4G7228KBJ
260-pin SODIMM	Unbuffered	4GB	512Mbx72	2667MT/s	ECC	x8	2	LP	VR9FU127228HBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2667MT/s	ECC	x8	2	LP	VR9FU2G7228JBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2667MT/s	ECC	x8	2	LP	VR9FU4G7228KBK
260-pin SODIMM	Unbuffered	16GB	2Gbx72	2933MT/s	ECC	x8	2	LP	VR9FU2G7228JBS
260-pin SODIMM	Unbuffered	16GB	2Gbx72	3200MT/s	ECC	x8	2	LP	VR9FU2G7228JBP
260-pin SODIMM	Unbuffered	16GB	2Gbx72	3200MT/s	ECC	x8	2	LP	VR9FU4G7228KBP
288-pin DIMM	Registered	8GB	1Gbx72	2133MT/s	ECC	x4	1	LP	VR9MR1G7224HBH
288-pin DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x4	1	LP	VR9MR2G7224JBH
288-pin DIMM	Registered	8GB	1Gbx72	2400MT/s	ECC	x4	1	LP	VR9MR1G7224HBJ
288-pin DIMM	Registered	16GB	2Gbx72	2667MT/s	ECC	x4	1	LP	VR9MR2G7224JBK
288-pin DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x4	2	LP	VR9MR2G7224HBH
288-pin DIMM	Registered	32GB	4Gbx72	2133MT/s	ECC	x4	2	LP	VR9MR4G7224JBH
288-pin DIMM	Registered	16GB	2Gx72	2133MT/s	ECC	x4	2	LP	VR9MR2G7224HBH
288-pin DIMM	Registered	16GB	2Gbx72	2400MT/s	ECC	x4	2	LP	VR9MR2G7224HBJ
288-pin DIMM	Registered	32GB	4Gbx72	2400MT/s	ECC	x4	2	LP	VR9MR4G7224JBJ

DDR4 PART NUMBERS

FORM FACTOR	BUFFERING	DENSITY	ORG.	SPEED	ECC	DRAM I/O	RANK	PROFILE	PART NUMBER
288-pin DIMM	Registered	32GB	4Gx72	2667MT/s	ECC	x4	2	LP	VR9MR4G7224JBK
288-pin DIMM	Registered	4GB	512Mbx72	2133MT/s	ECC	x8	1	LP	VR9MR127228HBH
288-pin DIMM	Registered	8GB	1Gbx72	2133MT/s	ECC	x8	1	LP	VR9MR1G7228JBH
288-pin DIMM	Registered	4GB	512Mbx72	2400MT/s	ECC	x8	1	LP	VR9MR127228HBJ
288-pin DIMM	Registered	8GB	1Gbx72	2400MT/s	ECC	x8	1	LP	VR9MR1G7228JBJ
288-pin DIMM	Registered	8GB	1Gx72	2400MT/s	ECC	x8	1	LP	VR9MR1G7228JBJ
288-pin DIMM	Registered	8GB	1Gbx72	2666MT/s	ECC	x8	1	LP	VR9MR1G7228JBK
288-pin DIMM	Registered	8GB	1Gbx72	2133MT/s	ECC	x8	2	LP	VR9MR1G7228HBH
288-pin DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x8	2	LP	VR9MR2G7228JBH
288-pin DIMM	Registered	8GB	1Gbx72	2400MT/s	ECC	x8	2	LP	VR9MR1G7228HBJ
288-pin DIMM	Registered	16GB	2Gbx72	2400MT/s	ECC	x8	2	LP	VR9MR2G7228JBJ
288-pin DIMM	Registered	16GB	2Gbx72	2667MT/s	ECC	x8	2	LP	VR9MR2G7228JBK
288-pin DIMM	Registered	8GB	1Gbx72	2133MT/s	ECC	x4	1	VLP	VR9VR1G7224HBH
288-pin DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x4	1	VLP	VR9VR2G7224JBH
288-pin DIMM	Registered	8GB	1Gbx72	2400MT/s	ECC	x4	1	VLP	VR9VR1G7224HBJ
288-pin DIMM	Registered	16GB	2Gbx72	2400MT/s	ECC	x4	1	VLP	VR9VR2G7224JBJ
288-pin DIMM	Registered	32GB	4Gbx72	2133MT/s	ECC	x4	2	VLP	VR9VR4G7224JHH
288-pin DIMM	Registered	32GB	4Gbx72	2667MT/s	ECC	x4	2	VLP	VR9VR4G7224JHK
288-pin DIMM	Registered	4GB	512Mbx72	2133MT/s	ECC	x8	1	VLP	VR9VR127228HBH
288-pin DIMM	Registered	8GB	1Gbx72	2133MT/s	ECC	x8	1	VLP	VR9VR1G7228JBH
288-pin DIMM	Registered	4GB	512Mbx72	2400MT/s	ECC	x8	1	VLP	VR9VR127228HBJ
288-pin DIMM	Registered	8GB	1Gbx72	2400MT/s	ECC	x8	1	VLP	VR9VR1G7228JBJ
288-pin DIMM	Registered	16GB	2Gbx72	2133MT/s	ECC	x8	2	VLP	VR9VR2G7228JBH
288-pin DIMM	Registered	16GB	2Gbx72	2400MT/s	ECC	x8	2	VLP	VR9VR2G7228JBJ
288-pin DIMM	Unbuffered	4GB	512Mbx64	2133MT/s	None	x8	1	LP	VR9MU126428HBH
288-pin DIMM	Unbuffered	4GB	512Mbx72	2133MT/s	ECC	x8	1	LP	VR9MU127228HBH
288-pin DIMM	Unbuffered	8GB	1Gbx64	2133MT/s	None	x8	1	LP	VR9MU1G6428JBH
288-pin DIMM	Unbuffered	8GB	1Gbx72	2133MT/s	ECC	x8	1	LP	VR9MU1G7228JBH
288-pin DIMM	Unbuffered	4GB	512Mbx64	2400MT/s	None	x8	1	LP	VR9MU126428HBJ

**Not a complete list of DDR4 Part Numbers*

*Viking Technology offers a full portfolio of DRAM modules from DDR5 down to legacy DDR1 memory solutions with support in every form factor, capacity, and configuration in each technology interface.

For DDR3, DDR2, and DDR1 inquiries, please contact your sales manager for detailed part number and configuration or email us at **sales@vikingtechnology.com**.

NOTES

For sales information, email us at sales@vikingtechnology.com, or visit our website for all global locations and contact information.

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