

# NVDIMM, SOLID STATE DRIVES & DRAM MODULES

## VIKING TECHNOLOGY | A PRODUCT DIVISION OF SANMINA

Viking Technology is a global technology leader in RF, Optical, Microelectronics and Memory technologies. With over 25 years of experience in engineering, design, manufacturing and test, Viking Technology has developed some of the most innovative OEM memory solutions for the embedded/industrial, medical, telecommunications, and military/aerospace markets.

Viking Technology specializes in Non-Volatile DIMMs (NVDIMM), Solid State Drives (SSD), and DRAM solutions. Viking Technology offers a range of products that spans embedded flash solutions such as eUSB, Secure Digital (SD), mSATA, SlimSATA, and M.2 SSD to enterprise solutions such as NVDIMM Persistent memory along with 3.5inch, 2.5inch & 1.8inch SATA/PCIe/NVMe/SAS SSDs. Viking Technology also offers one of the most comprehensive lines of DRAM solutions, from DDR4 to legacy support of DDR1 in every form factor including standard, ultra small and custom designs. In addition, Viking Technology develops some of the most rugged military-grade Multi-chip Packages (MCP) for extreme automotive and industrial environments.

Viking Technology's engineering services and design expertise also support strategic partner engagements to create custom solutions not found anywhere else. These solutions include mission critical products for extreme temperature (-40°C to +200°C), G shock and high vibration environments. Technologies include high-density die stacking, conformal coating, heat dissipation, miniaturization, future storage class memory, and specialized form factor designs.

### NVDIMM SOLUTIONS

- ▶ NVDIMM (DDR4) - N
- ▶ Energy Subsystems (ESS)
- ▶ Custom (ESS) Designs

### SSD/FLASH SOLUTIONS

- ▶ 3.5 in. SSD (UHC-Silo)
- ▶ 2.5 in. & 1.8 in. SSD
- ▶ M.2 SSD
- ▶ SlimSATA SSD
- ▶ mSATA SSD
- ▶ eUSB (Embedded USB) modules
- ▶ Discrete Flash Cards (DFC)
- ▶ Secure Digital
- ▶ USB ThumbDrives
- ▶ Custom storage solutions
- ▶ Extreme Temperature Designs

### DRAM SOLUTIONS

- ▶ DDR4, DDR3, DDR2, DDR1 Standard Modules & Small Form Factor Modules
- ▶ DDR4, DDR3, DDR2, DDR1 Stacked High-Density Modules
- ▶ Multi-Chip Packages (MCP)
- ▶ Extreme Temperature Memory
- ▶ Custom Memory Designs

### VIKING ADVANTAGES

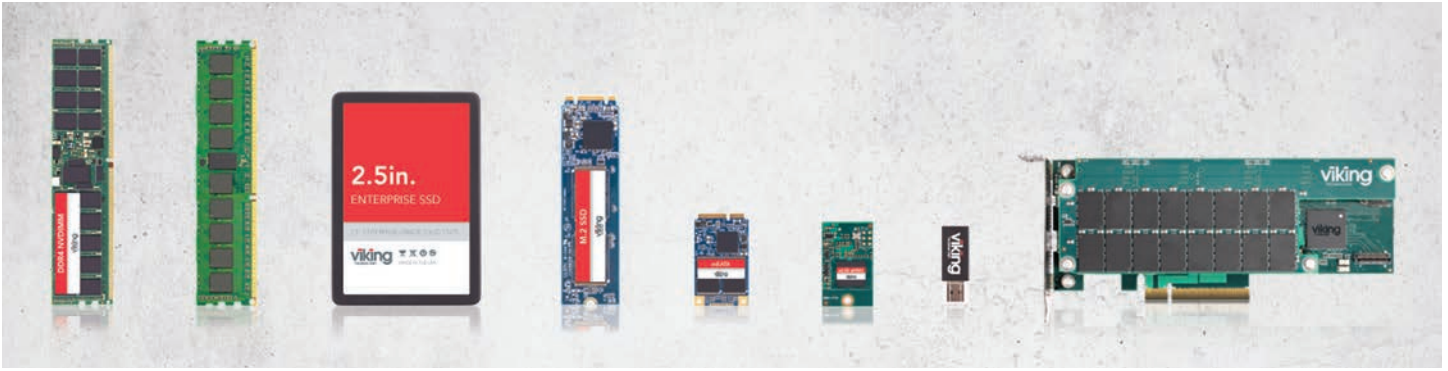
- ▶ Relieves burden on customer engineering resources
- ▶ In-house sustaining qualification and validations
- ▶ Advanced engineering & design

### ADVANCED CAPABILITIES

- ▶ Enhanced & customized testing
- ▶ Environmental stress screening
- ▶ Locked BOM
- ▶ Long-term supply support
- ▶ Conformal coated

### HIGH-TECHNOLOGY INNOVATIONS

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



DRAM	FLASH/SSD	NVDIMM/SCM ENERGY SUB-SYSTEMS	CUSTOMIZATION	MULTI-CHIP PACKAGING (MCP)
Full DRAM technology portfolio from DDR4 – Legacy DDR1	Full SSD product portfolio: 3.5" 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 +85°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		



**Global Locations**

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