

High Reliability ■ Industrial Grade ■ High Endurance

Broadest Portfolio of Industrial SSDs



By leveraging more than 30 years of solid state storage design expertise, Greenliant is dedicated to developing durable, reliable and secure storage solutions for embedded and industrial enterprise systems. The company is headquartered in Silicon Valley with product development centers in Santa Clara, Beijing, Shanghai, Xiamen and Hsinchu.

Durability



Longevity



Reliability



Quality



Security

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Focus Markets

Aerospace & Defense		<ul style="list-style-type: none"> • Black-box data recorder • Flight instrumentation • Radar / Sonar • Satellite communications • Video recording and imaging
Communications & Networking		<ul style="list-style-type: none"> • Base station • Network firewall • Router / Switch • Server • VoIP gateway / PBX
Enterprise		<ul style="list-style-type: none"> • Big data analytics • Cloud computing system • High performance database • Online transaction processing • Virtual desktop infrastructure
Industrial		<ul style="list-style-type: none"> • Factory automation system • Industrial panel PC • Single-board computer • Test & measurement instrumentation • Transportation system
Medical		<ul style="list-style-type: none"> • Data logger • Defibrillator • MRI and CAT scanner • Patient monitoring system • Ultrasound imaging
Security		<ul style="list-style-type: none"> • ATM / Banking • Network security • Biometrics • Surveillance • Point-of-Sale (POS)
Transportation		<ul style="list-style-type: none"> • Black-box data recorder • Driver information system • GPS and telematics • Hands-free communications • In-vehicle infotainment
Video		<ul style="list-style-type: none"> • Digital signage • Internet TV • Set-top box • Video conferencing • Video surveillance

Greenliant was founded with a focus on providing high quality industrial solid state storage solutions that meet the demands of long life embedded and enterprise applications in extreme environments. The company's first SSD controllers were developed at Silicon Storage Technology (SST) in the early 1990s, which Greenliant spun off from in May 2010. The company also pioneered the industry's first BGA SSD with a PATA interface in 2006. The original NANDrive™ BGA SSDs and ArmourDrive™ removable SSDs, based on planar NAND, were designed to serve the managed NAND requirements of the industrial, networking and automotive market segments.

With the introduction of 3D NAND, solid state storage devices are reaching higher reliability, performance and capacities that were not previously possible. To address different budgets, new markets and emerging applications, Greenliant has expanded its NANDrive and ArmourDrive lineup with a series of products based on 3D NAND. These products include the value PX and VX Series with 3-bit-per-cell (TLC) NAND, the MX Series for customers who prefer higher endurance of 2-bit-per-cell (MLC) NAND, and the premium EX Series with 1-bit-per-cell (SLC) NAND for ultra-robust data retention and highest endurance. Rugged and reliable, Greenliant's portfolio provides a broad range of capacities and features to give customers more flexibility and control when selecting their data storage solutions. Committed to customers with long-life applications, Greenliant offers extended support through its Long-Term Availability (LTA) program.

Expanded product series of SSDs and memory cards with advanced, high reliability NAND controllers and next generation 3D NAND



EX Series
I-temp SLC



MX Series
I-temp MLC



PX Series
I-temp TLC



PX Series
W-temp TLC



VX Series
W-temp TLC



PX Series
C-temp TLC

Industrial (I-temp): -40°C to +85°C • Wide (W-temp): -25°C to +85°C • Commercial (C-temp): 0°C to +70°C

Refer to individual device datasheets for operating temperature type information
(e.g., Ta = Ambient temperature, Tc = Case surface temperature)

EnduroSLC™ Technology

Superior Data Retention and Endurance

EnduroSLC™ is a proprietary 3D NAND management technology developed by Greenliant for high reliability applications requiring superior data retention and endurance in extreme temperature, high stress environments. With advanced hardware ECC capabilities and NAND flash management algorithms, EnduroSLC Technology significantly extends the write endurance of 1-bit-per-cell (SLC) SSDs reaching industry leading 400K program-erase (P/E) cycles. EnduroSLC enabled products meet robust data retention requirements under complex temperature conditions and support wide cross-temperature ranges between data programming and reading. Due to their substantially lower bit error rate, EnduroSLC SSDs provide better consistency in read/write performance throughout product lifetime.

To address the most demanding longevity requirements, Greenliant offers high endurance EX Series NANDrive, Industrial Enterprise and ArmourDrive product lines with EnduroSLC Technology. The EX Series SSDs are available in industry standard M.2, mSATA, 2.5", U.2 and BGA form factors with various endurance specifications.

EnduroSLC™ PRODUCT LINE

Endurance Level	Endurance Class	P/E Cycles
High	SLC-50 / SLC-60 / SLC-75	50K / 60K / 75K
Very High	SLC-100 / SLC-120 / SLC-150	100K / 120K / 150K
Ultra High	SLC-250 / SLC-300 / SLC-400	250K / 300K / 400K



NAND flash memory controllers used in Greenliant’s solid state drives and memory cards resolve the inherent deficiencies of NAND flash through intelligent wear leveling, bad block management and power interrupt data protection. Their advanced functionality is critical for achieving prolonged product life and superior data integrity in data storage systems. Greenliant’s NAND controllers use advanced Error Checking and Correction (ECC) engines, which can support both current and future NAND flash ECC requirements. Embedded firmware enables easy field updates at any stage of the product life cycle to address ever-evolving NAND flash technology.

With a focus on quality and high reliability features, Greenliant maintains a leadership position in NAND controller know-how and SSD technology. With their time-proven controller hardware design and robust, customizable firmware, Greenliant products are ideal for embedded storage systems. Trusted for demanding applications, NANDrive, ArmourDrive and Industrial Enterprise products are available with SLC, MLC and TLC NAND to meet a wide range of system requirements for lifespan, capacity, performance and endurance.

Greenliant NAND Controllers



Note: Greenliant uses best-in-class internally and externally developed controller IPs

NANDrive™ BGA SSDs

Available in four different interfaces (eMMC, NVMe, PATA, SATA), Greenliant's NANDrive portfolio offers the broadest range of ball grid array (BGA) form factor SSDs for industrial, communications and networking, defense and aerospace, transportation, artificial intelligence of things (AIoT), medical, security and video applications. As an integrated single-chip solution, NANDrive eliminates the need for long qualification cycles when there is a change of NAND flash technology.

Based on Greenliant's industrial grade NAND controllers, NANDrive SSDs provide easy migration from one NAND generation to another and have the same ball print across all capacities in each device family for backward compatibility. These versatile, small form factor devices are perfect for compact embedded systems that require rugged and reliable data storage. Greenliant offers both planar (SLC) NAND and 3D (SLC, MLC, TLC) NAND based NANDrive SSDs to address a variety of endurance, performance and longevity requirements. Best-in-class NANDrive EX Series products include eMMC 5.1, SATA 6Gb/s and NVMe PCIe Gen3 SSDs with EnduroSLC Technology for ultra-robust data retention and ultra-high endurance, from 50K to market leading 400K program-erase cycles.



NANDrive FAQs: www.greenliant.com/nandrive-faqs

Long-Term Availability: www.greenliant.com/support/#LTA-program

eMMC NANDrive



Part Number	GLS85VM1xxxE/G/Q	GLS85VM1xxxC	GLS85VM1xxxT
Interface	eMMC 5.1		
Product Series	EX	MX	VX
NAND Configuration	EnduroSLC™	MLC (3D NAND)	TLC (3D NAND)
Capacity	2GB, 4GB (100b) 2GB, 4GB, 8GB, 16GB, 32GB (153b)	8GB (100b) 8GB, 16GB, 32G, 64GB (153b)	16GB, 32G, 64GB (153b)
Voltage	3.3V		
Operating Temperature	Industrial: -40°C to +85°C		Wide: -25°C to +85°C
Storage Temperature	-40°C to +85°C		
Endurance	75K, 150K, 400K P/E cycles*	5K P/E cycles	3K P/E cycles
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	170 / 137	150 / 92	318 / 227
Package Type / Dimensions (mm)	100-ball LBGA / 14 x 18 x 1.40 153-ball LFBGA / 11.5 x 13 x 1.35		153-ball TFBGA / 11.5 x 13 x 1.00
Features	High performance: HS200 / HS400 Advanced global and group wear leveling SSD lifespan monitoring (SMART) Enhanced power interrupt data protection Data sanitization and RPMB Write protection		

Note: eMMC NANDrive's sequential read / write performance is measured in HS400 DDR mode using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

*100b: 400K endurance – 2GB; 75K/150K endurance – 4GB. 153b: 400K endurance – 2/4/8/16GB; 75K/150K endurance – 4/8/16/32GB.

NVMe NANDrive



Part Number*	GLS85LE1xxxE/G/Q	GLS85LE1xxxT
Interface	NVMe PCIe G3	
Product Series	EX	PX
NAND Configuration	EnduroSLC™	TLC (3D NAND)
Capacity	20GB, 40GB, 80GB, 160GB	64GB, 128GB, 256GB, 512GB
Voltage	3.3V / 1.8V / 0.9V	
Operating Temperature	Industrial: -40°C to +95°C	
Storage Temperature	-40°C to +85°C	
Endurance	75K, 150K, 400K P/E cycles*	5K P/E cycles
Data Retention	10 years / 1 year at end of device life	
Max Sequential Read/Write (MB/s)	2,400 / 1,480	2,380 / 665
Package Type / Dimensions (mm)	291-ball LFBGA / 16 x 20 x 1.40 291-ball FBGA / 16 x 20 x 1.85 (512GB)	
Features	High performance Advanced global and group wear leveling SSD lifespan monitoring (SMART) Enhanced power interrupt data protection Hardware Crypto Erase (HCE) AES 256-bit encryption	

NANDrive FAQs: www.greenliant.com/nandrive-faqs

Long-Term Availability: www.greenliant.com/support/#LTA-program

Note: NVMe NANDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.
 *400K endurance offered from 20GB to 80GB - Build to Order (BTO) / additional terms apply



SATA NANDrive

Part Number	GLS85LS1xxxP	GLS85LS1xxxE/G/Q	GLS85LS1xxxC
Interface	SATA 1.5Gb/s	SATA 6Gb/s	
Product Series	85LS	EX	MX
NAND Configuration	SLC	EnduroSLC™	MLC (3D NAND)
Capacity	2GB, 4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB, 16GB, 32GB, 64GB, 128GB	8GB, 16GB, 32G, 64GB, 128GB
Voltage	3.3V / 1.2V	3.3V / 1.0V	
Operating Temperature	Industrial: -40°C to +85°C		
Storage Temperature	-40°C to +85°C		
Endurance	60K P/E cycles	50K, 100K, 250K P/E cycles*	5K P/E cycles
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	120 / 80	470 / 340	410 / 115
Package Type / Dimensions (mm)	145-ball FBGA / 14 x 24 x 1.95	145-ball LBGGA / 14 x 24 x 1.40 145-ball FBGA / 14 x 24 x 1.95 (128GB MLC)	
Features	Secure erase and purge commands User-selectable protection zones SSD lifespan monitoring (SMART) Enhanced power interrupt data protection Bad block management 1mm ball spacing		

Note: SATA NANDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.
 *250K endurance – 2/4/8/16/32/64GB; 50K/100K endurance – 4/8/16/32/64/128GB

PATA NANDrive



Part Number	GLS85LPxxxxP
Interface	ATA / IDE
Product Series	85LP
NAND Configuration	SLC
Capacity	1GB, 2GB, 4GB, 8GB
Voltage	3.3V
Operating Temperature	Industrial: -40°C to +85°C
Storage Temperature	-40°C to +85°C
Endurance	60K P/E cycles
Data Retention	10 years / 1 year at end of device life
Max Sequential Read/Write (MB/s)	50 / 35
Package Type / Dimensions (mm)	91-ball BGA / 12 x 24 x 1.90 (1GB) 91-ball BGA / 14 x 24 x 1.90
Features	<ul style="list-style-type: none"> Connect to standard memory bus (for devices without ATA interface) Secure erase and purge commands User-selectable protection zones SSD lifespan monitoring (SMART) Enhanced power interrupt data protection Bad block management 1mm ball spacing

NANDrive FAQs: www.greenliant.com/nandrive-faqs

Long-Term Availability: www.greenliant.com/support/#LTA-program

Note: PATA NANDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

Greenliant's high-capacity Industrial Enterprise SSDs are designed for storage applications that require high reliability with sustainable low-latency and high IOPS performance. These SATA 2.5" and NVMe U.2 SSDs surpass traditional HDDs in their performance, security and ruggedness. Greenliant's flagship EX Series SSDs designed with EnduroSLC Technology provide ultra-robust data retention and can reach ultra-high write endurance up to 280 petabytes written (PBW), or 30 drive writes per day (DWPD) for 5 years, operating over a wide range of temperatures from -40°C to +85°C.

Greenliant's Industrial Enterprise storage products support AES-256 hardware encryption to protect sensitive user data and include power interrupt data protection to help prevent data loss during unexpected power failure events. EX Series (and select PX Series) SSDs also implement on-chip adaptive RAID for the highest levels of data integrity. With advanced features and outstanding quality of service, Greenliant's Industrial Enterprise SSDs are ideal for mission critical, I/O intensive applications in aerospace and defense, transportation, energy and power, communications, industrial control, cloud computing and AIoT.



NVMe U.2 Enterprise SSD



Part Number	G72UxxxP	G72UxxxR	G72UxxxQ	G72AxxxQ
Interface	PCIe Gen3x4			
Product Series	EX	PX	PX	PX
NAND Configuration	EnduroSLC™	TLC (3D NAND)		
Capacity	800GB, 960GB, 1.6TB, 1.92TB	1.92TB, 3.84TB, 7.68TB	1.6TB, 1.92TB, 3.2TB, 3.84TB, 6.4TB, 7.68TB	
DRAM	Yes			
Voltage	12V			
Operating Temperature	Industrial: -40°C to +85°C		Commercial: 0°C to +70°C	
Storage Temperature	-55°C to +110°C	-40°C to +85°C		
Endurance	Up to 280 PBW	Up to 15.2 PBW	3.6 DWPD for 5 years	
Data Retention	10 years / 1 year at end of device life			
Max Sequential Read/Write (MB/s)	2,600 / 1,900			
Form Factor / Dimensions (mm)	2.5-inch / 100.5 x 69.85 x 9.5			Half Height, Half Length Add-in Card
Features	On-chip adaptive RAID for reliable failover Dedicated power loss data protection circuitry Advanced ECC for 3D NAND Data purge / instant erase AES 256-bit encryption			

Long-Term Availability: www.greenliant.com/support/#LTA-program

For more information, contact your Greenliant representative: www.greenliant.com/sales



SATA 2.5" Enterprise SSD

Part Number	G32UxxxP	G32UxxxR	G32UxxxQ	G31UxxxR
Interface	SATA 6Gb/s			
Product Series	EX	PX	PX	PX
NAND Configuration	EnduroSLC™	TLC (3D NAND)		
Capacity	800GB, 960GB, 1.6TB, 1.92TB	1.92TB, 3.84TB, 7.68TB		240GB, 480GB, 960GB
DRAM	Yes			
Voltage	5V			
Operating Temperature	Industrial: -40°C to +85°C		Commercial: 0°C to +70°C	
Storage Temperature	-55°C to +110°C	-40°C to +85°C		
Endurance	Up to 280 PBW	Up to 15.2 PBW	3.6 DWPD for 5 years	1 DWPD for 5 years
Data Retention	10 years / 1 year at end of device life			
Max Sequential Read/Write (MB/s)	550 / 530			
Form Factor / Dimensions (mm)	2.5-inch / 100.5 x 69.85 x 9.5			2.5-inch / 100 x 69.85 x 7
Features	On-chip adaptive RAID for reliable failover (G3200) Dedicated power loss data protection circuitry Advanced ECC for 3D NAND Data purge / instant erase AES 256-bit encryption			

ArmourDrive™ SSDs

Greenliant's ArmourDrive portfolio of industry standard M.2, mSATA and 2.5" solid state drives is ideal for demanding industrial, networking, security, video and imaging applications that require reliable removable data storage. Tested for shock and vibration, and operating at extended temperature ranges, these products are built for durability and able to withstand extreme environments. ArmourDrive SSDs support popular NVMe PCIe and SATA interfaces and offer different NAND configurations (SLC, TLC) to meet a broad range of customer requirements for performance, endurance and lifespan.

ArmourDrive's advanced features include robust power interrupt data protection, hardware encryption, secure erase and lifespan monitoring. Available in a wide range of capacities, from 4 GB to 2 TB, industrial ArmourDrive SSDs surpass traditional storage with their superior functionality and reliability. In addition to 3D TLC NAND based PX Series, Greenliant offers ArmourDrive EX Series with EnduroSLC Technology for ultra-robust data retention and ultra-high endurance, from 60K to 300K P/E cycles.



ArmourDrive FAQs: www.greenliant.com/armourdrive-faqs

Long-Term Availability: www.greenliant.com/support/#LTA-program

SATA M.2 2242 ArmourDrive



Part Number	GLS87CRxxxGx	GLS87DTxxxG3	GLS87DPxxxG3
Interface	SATA 6Gb/s		
Product Series	EX	PX	PX
NAND Configuration	EnduroSLC™	TLC (3D NAND)	
Capacity	10GB, 20GB, 40GB, 80GB, 160GB, 320GB	64GB, 128GB, 256GB, 512GB, 1TB	64GB, 128GB, 256GB, 512GB
Voltage	3.3V		
Operating Temperature	Industrial: -40°C to +85°C		Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C		
Endurance	75K, 150K, 400K P/E cycles*	3K P/E cycles	
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	370 / 315	550 / 510	
Form Factor / Dimensions (mm)	M.2 2242 SS [‡] B+M key / 22 x 42 x 2.38 (Max)	M.2 2242 DS [‡] B+M key / 22 x 42 x 3.80 (Max)	M.2 2242 DS [‡] B+M key / 22 x 42 x 3.58 (Max)
Features	Power saving mode MTBF more than 2 million hours Secure erase, TRIM and SMART Advanced ECC for 3D NAND NCQ up to 32 commands Enhanced power interrupt data protection		

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

[‡] Single-sided (SS); Double-sided (DS)

*400K endurance offered from 10GB to 160GB - Build to Order (BTO) / additional terms apply

SATA M.2 2280 ArmourDrive



Part Number	GLS87BTxxxx3	GLS87BPxxxx3	GLS87BQxxxx3
Interface	SATA 6Gb/s		
Product Series	PX	PX	PX
NAND Configuration	TLC (3D NAND)		
Capacity	64GB, 128GB, 256GB, 512GB, 1TB, 2TB	64GB, 128GB, 256GB, 512GB, 1TB	240GB, 480GB, 960GB, 1.92TB
DRAM	No		Yes
Voltage	3.3V		
Operating Temperature	Industrial: -40°C to +85°C	Commercial: 0°C to +70°C	Industrial: -40°C to +85°C
Storage Temperature	-40°C to +85°C		
Endurance	3K P/E cycles		
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	550 / 510		
Form Factor / Dimensions (mm)	M.2 2280 DS [‡] B+M key / 22 x 80 x 3.80 (Max)	M.2 2280 DS [‡] B+M key / 22 x 80 x 3.58 (Max)	
Features	Power saving mode MTBF more than 2 million hours Secure erase, TRIM and SMART Advanced ECC for 3D NAND NCQ up to 32 commands Enhanced power interrupt data protection AES 256-bit encryption / OPAL 2.0 (select models)		

ArmourDrive FAQs: www.greenliant.com/armourdrive-faqs

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

[‡] Single-sided (SS); Double-sided (DS)



Part Number	GLS86FA0xxG1	GLS86FC004G1/ GLS86FQxxxGx	GLS86FSxxxx3
Interface	SATA 1.5Gb/s	SATA 6Gb/s	
Product Series	86	EX	PX
NAND Configuration	SLC	EnduroSLC™	TLC (3D NAND)
Capacity	8GB, 16GB, 32GB	4GB (86FC) 10GB, 20GB, 40GB, 80GB, 160GB, 320GB	64GB, 128GB, 256GB, 512GB, 1TB, 2TB
Voltage	3.3V		
Operating Temperature	Industrial: -40°C to +85°C		
Storage Temperature	-40°C to +85°C		
Endurance	60K P/E cycles	50K (86FC) 60K, 120K, 300K P/E cycles*	3K P/E cycles
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	120 / 80	370 / 315	550 / 510
Form Factor / Dimensions (mm)	JEDEC MO-300 / 29.85 x 50.80 x 4.85		
Features	Power saving mode MTBF more than 2 million hours Secure erase, TRIM and SMART Advanced global and group wear leveling Bad block management Enhanced power interrupt data protection		

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.
 *300K endurance offered from 10GB to 160GB - Build to Order (BTO) / additional terms apply

SATA 2.5" ArmourDrive



Part Number	GLS89SQxxxx3	GLS89SQxxxx3
Interface	SATA 6Gb/s	
Product Series	PX	PX
NAND Configuration	TLC (3D NAND)	
Capacity	240GB, 480GB, 960GB, 1.92TB	128GB, 256GB, 512GB, 1TB, 2TB
DRAM	Yes	
Voltage	5V	
Operating Temperature	Industrial: -40°C to +85°C	Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C	
Endurance	3K P/E cycles	
Data Retention	10 years / 1 year at end of device life	
Max Sequential Read/Write (MB/s)	550 / 530	
Form Factor / Dimensions (mm)	2.5-inch / 100 x 69.85 x 7.00	
Features	Power saving mode MTBF more than 2 million hours Secure erase, TRIM and SMART Advanced ECC for 3D NAND NCQ up to 32 commands Enhanced power interrupt data protection AES 256-bit encryption / OPAL 2.0 (select models)	

ArmourDrive FAQs: www.greenliant.com/armourdrive-faqs

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

For more information, contact your Greenliant representative: www.greenliant.com/sales



Part Number*	GLS88DQ064G3	GLS88ETxxx3
Interface	PCIe Gen3x2	PCIe Gen4x4
Product Series	PX	PX
NAND Configuration	TLC (3D NAND)	
Capacity	64GB	256GB, 512GB, 1TB
DRAM	No	
Voltage	3.3V	
Operating Temperature	Industrial: -40°C to +85°C	Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C	
Endurance	3K P/E cycles	
Data Retention	10 years / 1 year at end of device life	
Max Sequential Read/Write (MB/s)	1,550 / 950	3,600 / 2,400
Form Factor / Dimensions (mm)	M.2 2242 DS [‡] B+M key / 22 x 42 x 3.58 (Max)	M.2 2230 SS [‡] M key / 22 x 30 x 2.23 (Max)
Features	Power management: APST / ASPM (select models) MTBF 2 million hours Secure erase, TRIM and SMART Advanced ECC for 3D NAND AES 256-bit encryption (select models)	

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

[‡] Single-sided (SS); Double-sided (DS)

*Target release for additional products: mid 2024

NVMe M.2 2280 ArmourDrive



Part Number*	GLS88BPxxxx3	GLS88ARxxx3
Interface	PCIe Gen3x4	
Product Series	PX	PX
NAND Configuration	TLC (3D NAND)	
Capacity	240GB, 480GB, 960GB, 1.92TB	128GB, 256GB, 512GB, 1TB, 2TB
DRAM	Yes	No
Voltage	3.3V	
Operating Temperature	Industrial: -40°C to +85°C	Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C	
Endurance	3K P/E cycles	
Data Retention	10 years / 1 year at end of device life	
Max Sequential Read/Write (MB/s)	3,600 / 2,400	1,550 / 950
Form Factor / Dimensions (mm)	M.2 2280 DS‡ M key / 22 x 80 x 3.58 (Max)	M.2 2280 SS‡ M key / 22 x 80 x 2.23 (Max)
Features	Power management: APST / ASPM (select models) MTBF 2 million hours Secure erase, TRIM and SMART Advanced ECC for 3D NAND AES 256-bit encryption / OPAL 2.0 / Pyrite (select models)	

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

‡ Single-sided (SS); Double-sided (DS)

*Target release for additional products: mid 2024

Greenliant's ArmourDrive memory cards are available in industry standard SD and microSD form factors. Tested for shock and vibration, and operating at industrial (-40°C to +85°C) and wide (-25°C to +85°C) temperatures, rugged and reliable ArmourDrive memory cards are made for demanding applications and can operate in tough conditions. They support SMART commands and use advanced NAND flash management technology to ensure high data integrity and prevent data loss.

Offered in various NAND configurations (SLC, TLC) and endurance specifications (from 3K to 30K P/E cycles), ArmourDrive memory cards give industrial, medical, security, gaming, video and imaging customers added flexibility when selecting high quality, removable solid state storage for embedded systems.



microSD ArmourDrive



Part Number	GLS93MP0xxG1	GLS93MPxxxG3 / GLS93MRxxxG3	GLS93MRxxxG3
Interface	SD Specification Version 6.10		
Product Series	EX	PX	PX
NAND Configuration	SLC (3D NAND)	TLC (3D NAND)	
Capacity	8GB, 16GB, 32GB, 64GB	64GB, 128GB, 256GB	64GB, 128GB, 256GB
Voltage	3.3V		
Operating Temperature	Industrial: -40°C to +85°C		Wide: -25°C to +85°C
Storage Temperature	-40°C to +85°C		
Endurance	30K P/E cycles	3K P/E cycles	
Data Retention	10 years / 1 year at end of device life		
Max Sequential Read/Write (MB/s)	100 / 85		
Form Factor / Dimensions (mm)	microSD / 11 x 15 x 1.00		
Features	SSD lifespan monitoring (SMART) Static and Dynamic Wear Leveling MTBF more than 3 million hours Advanced ECC for 3D NAND Password protection (optional) Small form factor Water, shock and vibration resistant; radiation tolerant		

ArmourDrive FAQs: www.greenliant.com/armourdrive-faqs

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

SD ArmourDrive



Part Number	GLS93SP0xxG1	GLS93SPxxxG3 / GLS93SRxxxG3
Interface	SD Specification Version 6.10	
Product Series	EX	PX
NAND Configuration	SLC (3D NAND)	TLC (3D NAND)
Capacity	8GB, 16GB, 32GB, 64GB	64GB, 128GB, 256GB
Voltage	3.3V	
Operating Temperature	Industrial: -40°C to +85°C	
Storage Temperature	-40°C to +85°C	
Endurance	30K P/E cycles	3K P/E cycles
Data Retention	10 years / 1 year at end of device life	
Max Sequential Read/Write (MB/s)	95 / 85	
Form Factor / Dimensions (mm)	SD / 24 x 32 x 2.10	
Features	SSD lifespan monitoring (SMART) Static and Dynamic Wear Leveling MTBF more than 3 million hours Advanced ECC for 3D NAND Password protection (optional) Write protection / Lock switch Water, shock and vibration resistant; radiation tolerant	

Note: ArmourDrive's sequential read / write performance is measured using 128KB transfer size. Faster performance can be achieved with larger data transfer sizes.

Specialty NOR Flash Memory



Greenliant's industrial grade Concurrent SuperFlash™ (CSF™) provides high reliability of more than 100 years' data retention and endurance up to 100,000 cycles, low power consumption and a small footprint, making it ideal for code storage applications and space-constrained systems. Concurrent SuperFlash supports Read-while-Write operations and has on-chip hardware for data protection to meet the stringent performance and data integrity requirements of embedded applications.

Concurrent SuperFlash	
Part Number	GLS36VF1601G
Type	16 Mbit (x8/x16) Concurrent SuperFlash, Bottom Boot
Density	1 Mbit x16 or 2 Mbit x8
Voltage	2.7V – 3.6V
Operating Temperature	Industrial: -40°C to +85°C
Storage Temperature	-65°C to +150°C
Read Access Speed (ns)	70
Package Type / Dimensions (mm)	TSOP-48 / 12 x 20 x 1.2

Microchip (Atmel) Cross-Reference: www.greenliant.com/products/flash-memory.dot

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