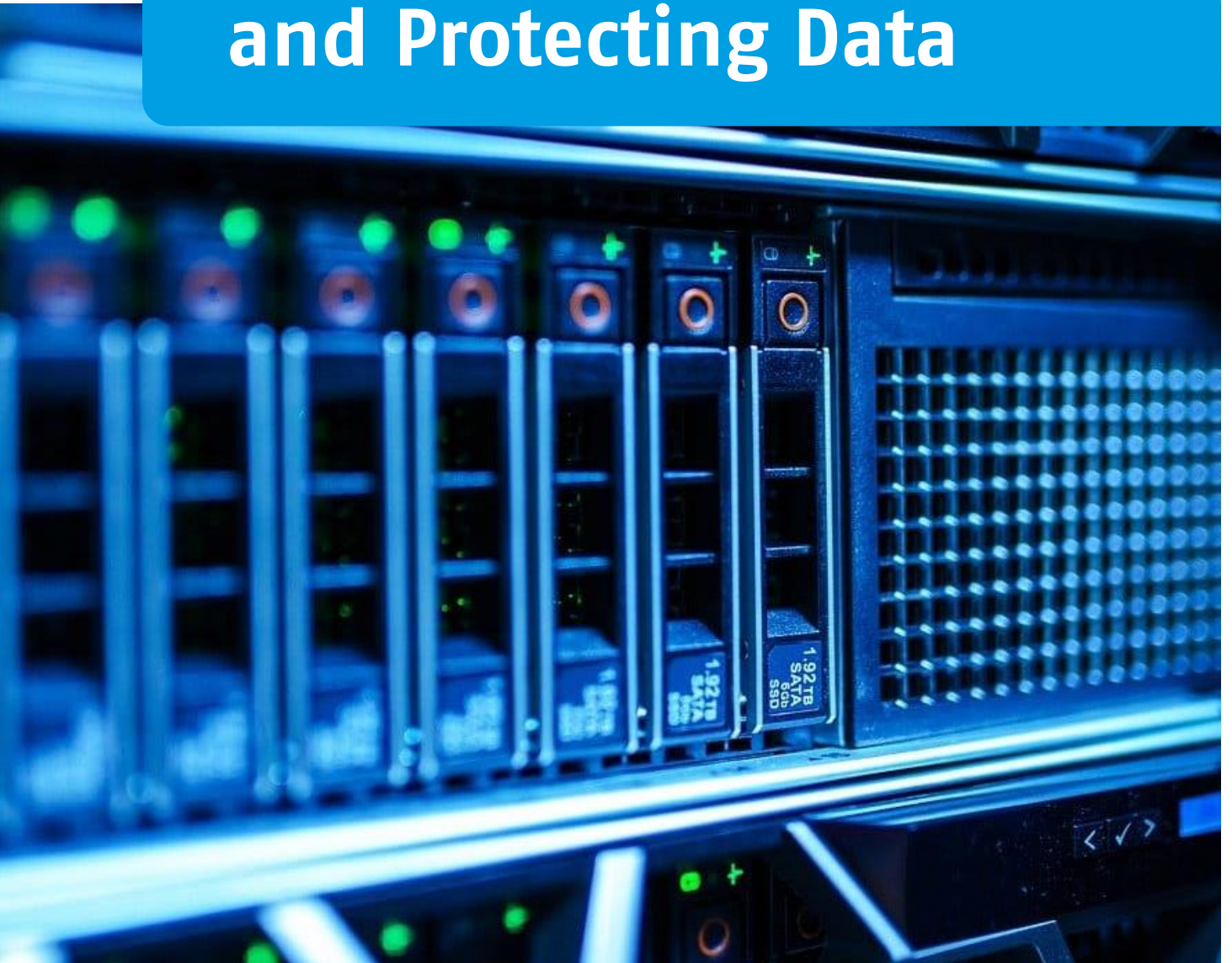


Reliably Storing and Protecting Data



High performance PCIe / NVMe Products

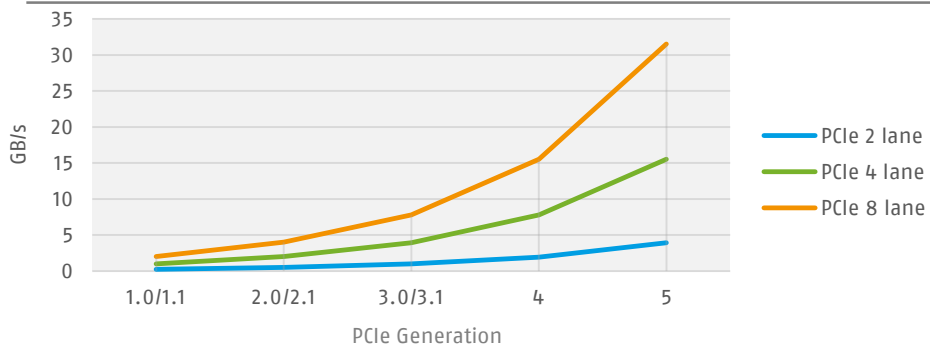
PCIe Products

The PCIe electrical interface together with the NVMe protocol provides a robust, scalable, high performance, and low overhead point-to-point connection between the host and the storage device. It allows a broad variety of storage devices targeting different applications, each with

specific requirements concerning capacity, performance, thermal envelop, power fail protection and cost.

Swissbit offers a wide portfolio of products developed and produced with high quality and longevity for demanding applications.

PCIe data rates by number of lanes



Product suitability per segment

Number of PCIe Lanes	U.3 4	U.2 4	E1.s 4	CFexpress 2	M.2 4-2	M.2 BGA 4
Datacenter	•••	••	•••	•	••	•
Enterprise	••	•••	•••	•	••	•
Industrial	•	••	•	•••	•••	••
NetCom	•	•••	•	•	•••	••
IoT	•	•	•	•	••	•••
Automotive	•	•••	•	•	••	•••



PCIe product form factors

Made in Germany

Swissbit PCIe products come in various form factors, performance grades and capacities optimized for different applications with one common ground: Swissbit quality and product reliability.

Product size scaled by 50%

U.3

100.45 mm x 69.85 mm
15mm thickness



U.2

100.20 mm x 69.85 mm
15 mm thickness



M.2 2280

22 mm x 80 mm x 3.8 mm



M.2 2242

22 mm x 42 mm x 3.8 mm



M.2 2230

22 mm x 30 mm x 3.8 mm



E.1.s

31.5 mm x 111.5 mm
Thickness 5.9 / 9.0 / 15.0 mm



M.2 2216 BGA

22 mm x 16 mm
x 0.16 mm



CFexpress™

38.5 mm x 29.6 mm
x 3.8 mm



D1200 U.3



D2200 U.2



N5200 U.2



Information

Type	U.3 Data Center SSD	U.2 Data Center SSD	U.2 Enterprise SSD
Standard & Interface	PCIe Gen 4.0 / NVMe 1.4, x4	PCIe Gen 5.0 / NVMe 2.0b, x4	PCIe Gen 4.0 / NVMe 1.4, x4
Form Factor	U.3, 4 lanes	U.2, 4 lanes	
Outline Dimensions	100.4mm x 69.9mm x 14.8mm		
Flash Type	3D NAND eTLC		
Density Range	7.68 TB – 15.4 TB		1.92 TB – 7.68 TB
Data Retention	1 year @ life begin / 3 months @ life end		
Endurance [DWPD] Enterprise	1.7 DWPD for 5 years	1.5 DWPD for 5 years	> 1 DWPD for 5 years

Temperature

Operating Temperature	Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C

Performance

Sequential Read (MB/s)	up to 7,000	up to 14,000	up to 7,100
Sequential Write (MB/s)	up to 6,900	up to 10,000	up to 4,200
Random 4KB Read (IOPS)	up to 1,600,000	up to 2,600,000	up to 1,150,000
Random 4KB Write (IOPS)	up to 900,000	up to 510,000	up to 950,000
FTL / Cache support	DDR4 DRAM		

Robustness

MTBF	≥ 2,000,000 hours	≥ 2,000,000 hours	≥ 2,500,000 hours
Data Reliability	< 1 sector per 10 ¹⁷ bits		

Electrical Data

Voltage	VCC: 12V ±8%		
Average Power, Mixed Rd/Wr	< 20 W	< 20 W	< 15 W

Feature List

Features & Tools	<p>Full Data Path Protection S.M.A.R.T Flexible Power Management Hot Pluggable TRIM AES 256 Data Encryption & Crypto Erase EUI64/NGUID Firmware Upgrade without Reset Timestamp Telemetry Weighted Round Robin (WRR) Persistent Event Log Secure Download Secure Boot Multi-namespace support up to 128 powersafe™ functionality</p>	<p>powersafe™ Functionality Full Data Path Protection S.M.A.R.T Flexible Power Management Hot Pluggable TRIM Multi-namespace support up to 128 AES-XTS 256 Data Encryption & Crypto Erase EUI64/NGUID Support NVMe-MI 1.2b, support MCTP over SMBus Firmware Upgrade without Reset Timestamp Telemetry Weighted Round Robin (WRR) Persistent Event Log Secure Download Secure Boot</p>	<p>OCP NVMe Cloud SSD Specification 1.0 compliant Dynamic Internal RAID Health log Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T., Telemetry) Vital Product Data (VPD) over SMBus supported AES256 encryption / TCG OPAL 2.01 Secure Boot <ul style="list-style-type: none"> • ECDSA-256 FW Image Authentication Supported • SHA3-512 Hash Algorithm Supported End to end path protection Crypto Erase NVMe Management Interface Basic Management Command Multi-namespace support up to 128 powersafe™ functionality</p>
More Information	For more details see www.swissbit.com/product-finder		

N-20m2 / N-26m2 N-30m2 / N-36m2
N2000 / N2600 N3000 / N3600

N3200 M.2

N5200 E1.S



Information

Type	M.2 PCIe / NVMe			E1.S PCIe / NVMe
Standard & Interface	PCIe 3.1 / NVMe 1.3, x4	PCIe Gen 4.0 / NVMe 1.4, x4		
Form Factor	M.2 2280, 2242, 2230 M key, 4 lanes	M.2 2280, 2242 M key, 4 lanes	M.2 2280 M key, 4 lanes	E1.S 4 lanes (5.9, 9.5, 15, 25mm)
Outline Dimensions	80,42,30 x 22 x 3.5 mm	80, 42 x 22 x 3.58 mm	80 x 22 x 3.58 mm	111.5 x 33.75 x 5.9/9.5/15/25mm
Flash Type	3D NAND TLC / pSLC	3D NAND TLC / pSLC	3D NAND eTLC	3D NAND eTLC
Density Range ¹⁾	TLC: 15 GB – 480 GB pSLC: 5 GB – 160 GB	TLC: 240 GB – 3,840 GB pSLC: 80 GB – 320 GB	240 GB – 3,840 GB	1.92 TB – 7.68 TB
Data Retention	10 years @ life begin 1 year @ life end		1 years @ life begin 3 months @ life end	
Endurance (3D TLC) Sequential Enterprise ²⁾	up to 2.7 DWPD up to 0.35 DWPD	up to 3 DWPD up to 0.77 DWPD	> 1 DWPD	> 1 DWPD

Temperature

Operating Temperature	Commercial: 0°C to +70°C Industrial: -40°C to +85°C	Industrial: -40°C to +85°C	Commercial: 0°C to +70°C
Storage Temperature	-40°C to +85°C		

Performance

Sequential Read (MB/s)	up to 1,770 / 1,750	up to 3,500 / 3,500	up to 3,500	up to 7,100
Sequential Write (MB/s)	up to 830 / 830	up to 3,100 / 2,450	up to 3,100	up to 4,200
Random 4KB Read (IOPS)	up to 140,000 / 140,000	up to 475,000 / 190,000	up to 475,000	up to 1,150,000
Random 4KB Write (IOPS)	up to 130,000 / 130,000	up to 525,000 / 525,000	up to 525,000	up to 950,000

Robustness

MTBF	≥ 2,000,000 hours	≥ 3,000,000 hours	≥ 2,500,000 hours
Shock	1,500 g, 0.5 ms		
Vibration	50 g, 80–2,000 Hz		3 Grms, 7–800 Hz
Humidity	85 % RH 85 °C, 1,000 hrs		5% – 95% RH

Electrical Data

Voltage	3.3V +- 5%	12V ± 8%
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Feature List

Features & Tools ¹⁾	HMB support (Host memory buffer)	DRAM support HW powersafe™ on 2280 (P)	DRAM support HW powersafe™	DDR4 DRAM support HW powersafe™
	Active and Passive Data Care Management AES 256 / E2E Data Path Protection FW Power Fail Data Loss Protection Active State Power Management (ASPM) Support TCG OPAL 2.0 (N-2*m2, N-3*m2 on request) SBDM Tool & SDK for detailed S.M.A.R.T. based Life Time Monitoring			OCP NVMe Cloud SSD– Specification 1.0 compliant Dynamic Internal RAID S.M.A.R.T., Telemetry AES256 encryption TCG OPAL 2.01 Secure boot End to end path protection Crypto erase NVMe MI Basic Mngt Cmd 16 up to 128 Namespaces
More Information	For more details see www.swissbit.com/product-finder			

¹⁾ Not all densities and configurations may be available. Customization on request

²⁾ DWPD values are according to JESD219 Enterprise Endurance Workload based on a service life of 3 years for TLC and 5 years for eTLC drives



Information

Type	CFexpress™ Type B Card	
Standard and Interface	CFexpress v2.00 2 lanes PCIe 3.1 / NVMe 1.3	
Connector	CFexpress 30u" AU	
Outline Dimensions	38.5 × 29.6 × 3.8 mm	
Flash Type	3D NAND TLC	3D NAND pSLC
Density Range	15 GB-480 GB / 60 GB-960 GB	5 GB-160 GB / 20 GB-320 GB
Data Retention	10 years @ life begin 1 year @ life end	
Endurance [DWPD] *	Up to 1.8 / 2.2	Up to 54 / 78

Temperature

Operating Temperature	Industrial: -40°C to +85°C
Storage Temperature	-40°C to +85°C

Performance

Sequential Read(MB/s)	up to 1,610 / 1,610	up to 1,620 / 1,610
Sequential Write (MB/s)	up to 830 / 830	up to 700 / 930
Random 4KB Read(IOPS)	up to 115,000 / 140,000	up to 128,000 / 138,000
Random 4KB Write(IOPS)	up to 130,000 / 134,000	up to 121,000 / 143,000

Robustness

MTBF	≥ 2,000,000 hours
Shock	500 g, 1 ms
Vibration	20 g, 10-2,000 Hz
Humidity	90 % RH 85 °C, 96 hrs

Electrical Data

Voltage	3.3 V ± 5 %
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Feature List

Features & Tools	<ul style="list-style-type: none"> HMB Support End to End Data Path Protection AES 256 / TCG OPAL 2.0 Firmware based Power Fail Data Loss Protection Active State Power Management (ASPM) Support SBDM Tool & SDK for detailed S.M.A.R.T. based Life Time Monitoring
More Information	For more details see www.swissbit.com/product-finder

* DWPD values are according to JESD219 Client Endurance Workload based on a service life of 3 years



Information

Type	PCIe M.2 1620 BGA	
Standard & Interface	PCIe Gen 3.1 / NVMe 1.3 4 PCIe lanes	
Package	BGA, 0.8mm pitch	
Outline Dimensions	16 x 20 x 1.8 mm	
Flash Type	3D NAND TLC	3D NAND pSLC
Density Range	15 GB-480 GB / 60 GB-960 GB	5 GB-160 GB / 20 GB-320 GB
Data Retention	10 years @ life begin 1 year @ life end	
Endurance [DWPD] *	Up to 1.8 / 2.2	Up to 54 / 78

Temperature

Operating Temperature	Industrial: -40°C to +85°C
Storage Temperature	-40°C to +85°C

Performance

Sequential Read(MB/s)	up to 1,770 / 1,750	up to 1,780 / 1,780
Sequential Write (MB/s)	up to 750 / 860	up to 760 / 870
Random 4KB Read(IOPS)	up to 140,000 / 140,000	up to 140,000 / 89,000
Random 4KB Write(IOPS)	up to 112,000 / 134,000	up to 136,000 / 136,000

Electrical Data

Voltage	3.3V ±5%, 1.8V ±5%, 0.9V ±5%
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Feature List

Features & Tools	<ul style="list-style-type: none"> HMB support Dynamic and Static Wear Leveling Page Mode Flash Translation Layer Data Care Management Write Amplification Reduction Power Fail Data Loss Protection In-Field Firmware Update Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) AES256 Encryption
More Information	For more details see www.swissbit.com/product-finder

* DWPD values are according to JESD219 Client Endurance Workload based on a service life of 3 years

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