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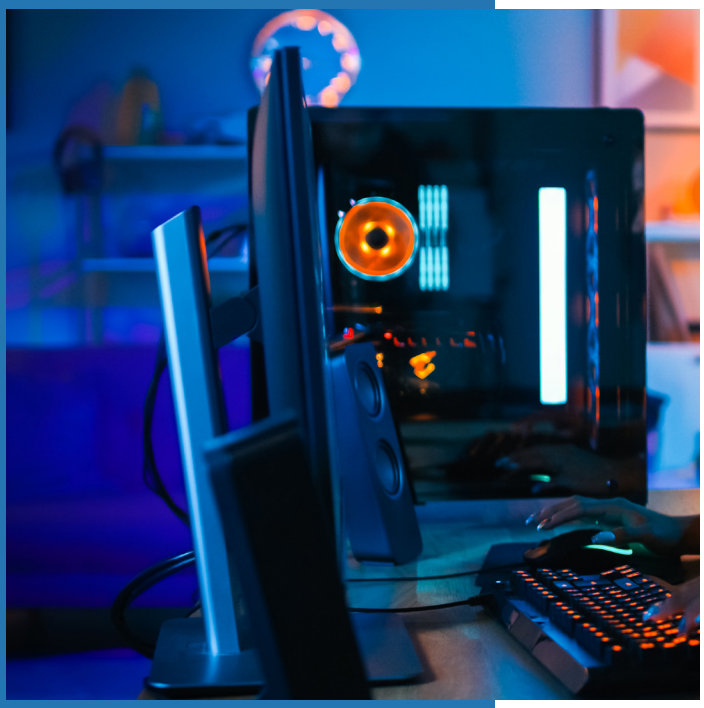

Next Generation Gaming Workload

Phison E18 is a market-proven flash controller solution that unleashes true PCIe Gen4 performance for SSDs. Adopted by numerous module vendors, E18 enables performance above 7,000 MB/s in sequential operation and stands as the most mature PCIe Gen4 solution in the SSD market following Phison E16, which was the world's first PCIe Gen4 flash controller solution launched in 2019.

Application

High-performance PCs

Gaming PCs/gaming consoles

High-end workstations

Product Features

Market-leading performance

Manufactured using TSMC's 12nm process technology, E18 is optimized for a PCIe Gen4x4 interface, enabling SSDs with maximized bandwidths and link efficiency. Paired with state-of-the-art 3D NAND flash memory chips, the PS5018-E18 handles application payloads immaculately with minimal latency.

Excellent scalability with flexible flash enablement

The E18 supports up to 8 flash channels with 32 chip enables (CEs) on both of the mainstream NAND flash interfaces in ONFI and Toggle, allowing capacity scaling, from 500 GB up to 8 TB.

Phison 4th Generation LDPC ECC engine

While flash memory cells deteriorate with use and can generate stored data bit errors, the E18 utilizes Phison's proprietary Low Density Parity Check error-correcting code algorithm to ensure robust data entry and extraction, as well as protection from internal corruption.

Flexible Security Options

The E18 is well-equipped for the implementation of multiple security functions compliant to industry standards. Along with Phison's proprietary End-to-End Data Path Protection design, the E18 comes with full protection from malware and hacking to eliminate risk of security breaches.

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Features	Specifications
Host Interface	- PCIe 4.0 x4 (Bandwidth: 16GT/s x4) - Compliance with PCI Express Base Specification Revision 4.0 - Compliance with NVMe 1.4
Processor	- 3x ARM Cortex-R5 and 2x Proprietary IP CoXProcessor™ - TSMC 12nm process technology
Flash Controller	- Up to 8 Channels with 32 Chips Enable (CE) - Flash transfer rate up to 1,600MT/s - Capacity up to 8TB - Support 3D TLC and QLC NAND flash memory - Compliance with Toggle 4.0 and ONFi 4.2 - Flash I/O operating voltage supply 1.2V/1.8V
DRAM Controller	- DDR4 (32 bit, 2666Mbps)
Data Reliability	- Phison 4th generation LDPC ECC & RAID ECC - DDR ECC engine - End-To-End Data Path Protection
Security	- Pyrite - AES 256 - SHA 512 - RSA 4096 - TCG Opal
Performance	- Sequential Read up to 7,500MB/s - Sequential Write up to 7,100MB/s - 4K Random Read up to 1,000K IOPS - 4K Random Write up to 1,000K IOPS
Power Management	- L1.2 < 5mW
Temperature Range	- Operating range: 0~70 °C - Storage range: -40~85 °C - Operating junction temperature: -40~125 °C
Package	- 529-ball FCCSP, 12 mm x 12 mm
Peripheral	- Built-in internal thermal sensor - GPIO pins - Built-in UART function - I2C and SPI for external ROM

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Find more information and resources at: phisonblog.com and phison.com

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Capacity [1]	500GB	1,000GB	2,000GB	4,000GB
Interface	PCIe Gen4.0x4 NVMe 1.4			
Form Factor	M2 2280-S2	M2 2280-S2	M2 2280-D2	M2 2280-D2
NAND Flash	3D TLC	3D TLC	3D TLC	3D TLC
Performance [2 3]				
Sequential Read	7000 MB/s	7200 MB/s	7200 MB/s	7200 MB/s
Sequential Write	3000 MB/s	6000 MB/s	6850 MB/s	6850 MB/s
4K Random Read	450K IOPS	750K IOPS	1000K IOPS	940K IOPS
4K Random Write	700K IOPS	1000K IOPS	1000K IOPS	1000K IOPS
Power [4]				
Supply Voltage	M.2 3.3V ± 5%			
Active (Average)	6.5W	6.7W	8.2W	9.3W
Idle	20mW	24mW	31mW	33mW
Low Power PS4 (L1.2)	3mW	3mW	3mW	3mW
Environmental				
Operating Temperature	0°C - 70°C			
Non-Operating Temperature	-40°C - 85°C			
Reliability & Warranty				
TBW [5]	350TB(5year)	700TB(5year)	1400TB(5year)	3000TB(5year)
Warranty	5 Years			
MTBF	1.6 Million hours			
UBER	$<10^{-16}$ bits			
Advanced Features	- End-to-End Data Protection - Pyrite Support - Thermal Monitoring			

(1) 1 GB = 1,000,000,000 bytes
(2) Sequential Performance is based on CrystalDiskMark 7.0.0, 1 GB range, QD=16, Thread=1 , and test drive set as secondary
(3) Random Performance is based on IOMeter, 1 GB range, 4K data size, QD=128, 16 worker, 4K aligned
(4) Power consumption is measured during the sequential read and write operations performed by CrystalDiskMark with the conditions described in (3)
(5) TBW is Total Bytes Written and the results are obtained in compliance with JESD218 Standards

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