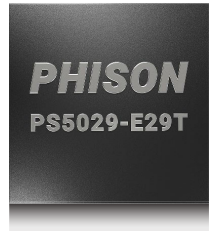# PHISON

Ultimate Versatility, Peak Reliability

Phison PS5029-E29T NAND flash controller IC solution uses the latest LDPC error-correcting technology to increase NAND compatibility to deliver SSDs with the highest reliability. Leveraging the power of PCIe Gen4, this DRAM-less series exceeds 7GB/s bandwidth while remaining power-and cost-efficient.

PHISON
PS5029-E29T

Application

Handheld Gaming

Notebooks

Business PCs

Product Features

Market-leading Performance

Based on the Phison E27T, the E29T is optimized for applications requiring the most efficient data path for both performance and power. This product meets the 7GB/s requirement by utilizing PCIe Gen4x4 to deliver superior bandwidth and compatibility using the latest 3D NAND technology.

Outstanding Cost-effectiveness

Phison E29T can saturate the PCIe Gen4 interface bandwidth without a DRAM cache to ensure compelling cost savings for your design, creating design-in opportunities in the most cost-sensitive markets.

Superb Power Efficiency

Phison E29T offers the most competitive power efficiency, turning your notebook into an all-day productivity weapon even when AC power is unavailable. The advanced management features such as L1.2 give your system extreme idle efficiency so you can stow your notebook without turning it off.

Phison 7th Generation LDPC ECC Engine

Phison's proprietary 7th-generation LDPC ECC engine operates on 4K frame sizes with increased spare NAND space. Additionally, support for advanced machine learning algorithms enhances performance and flexibility, assuring superior NAND flash reliability.

CONTROLLER
PS5029-E29T

Features	Specifications
Host Interface	- PCIe 4.0x4 (Bandwidth: 16GT/s x4) - Backward compatible with existing PCIe generation transfer rates - Compliance with PCI Express Base Specification Revision 4.0 - Compliance with NVMe 2.0 - Host Memory Buffer (HMB) support
Processor	- Single-CPU architecture with built-in 32-bit microcontroller - TSMC 12nm process technology
Flash Controller	- Up to 4 Channels with 16 Chip Enable (CE) counts - Flash transfer rate up to 3600MT/s - Capacity up to 8TB - Support 3D TLC and QLC NAND flash memory - Compliance with Toggle 5.1 and ONFi 5.1 - Flash I/O operating voltage supply 1.2V
Data Reliability	- Phison 7th generation LDPC ECC & RAID ECC - SRAM ECC engine - End-to-End Data Path Protection
Security	- Pyrite - AES 256 - SHA 512 - RSA 4096 - TCG Opal
Performance	- Sequential Read up to 7400MB/s - Sequential Write up to 6600MB/s - 4K Random Read up to 1000K IOPS - 4K Random Write up to 1400K IOPS
Power Management	- L1.2 < 5mW
Temperature Range	- Operating range: 0~70 °C - Storage range: -40~85 °C
Package	- 228-ball FCCSP, 8.0mm x 12.5mm
Peripheral	- Built-in internal thermal sensor - GPIO pins - Built-in UART function - I2C and SPI for external ROM - I3C supported

PHISON

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

Solutions

PS5029-E29T

SSD Solutions	PS5029-E29T			
Capacity [1]	512GB	1TB	2TB	4TB
Interface	PCIe Gen 4.0 x4 NVMe 2.0			
Form Factor	M.2 2280 / M.2 2230			M.2 2280
NAND Flash	3D TLC / 3D QLC			
Performance [2] [3]				
Sequential Read	7200 MB/s	7400 MB/s	7400 MB/s	7200 MB/s
Sequential Write	5000 MB/s	6100 MB/s	6400 MB/s	6200 MB/s
4K Random Read	530K IOPS	1000K IOPS	1000K IOPS	950K IOPS
4K Random Write	800K IOPS	950K IOPS	950K IOPS	1400K IOPS
Power Consumption [4]				
Supply Voltage	M.2 3.3V ± 5%			
Active (Average)	3850 mW	4130 mW	4150 mW	4350 mW
Idle	50 mW	50 mW	50 mW	50 mW
Low Power PS4 (L1.2)	5 mW	5 mW	5 mW	5 mW
Environmental				
Operating Temperature	0°C - 70°C			
Non-Operating Temperature	-40°C - 85°C			
Reliability & Warranty				
TBW [5]	300 TB	600 TB	1200 TB	2400 TB
MTBF	1.5 million hours			
UBER	$<10^{-16}$ bits			
Advanced Features				
- End-to-End Data Protection - TCG Pyrite Support - Thermal Monitoring				

[1] 1 GB = 1,000,000,000 bytes
[2] Sequential Performance is based on CrystalDiskMark 8.0.4, 1 GB range, QD=8, 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 (2)
[5] TBW is Total Bytes Written and the results are obtained in compliance with JESD218 Standards

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