PHISON

CONSUMER

Pinnacle of Gen4 Power and Value

Phison PS5027-E27T is a game-changing DRAM-less PCIe Gen4 SSD controller IC solution that pushes for true PCIe Gen4 bandwidth above 7GB/s and takes cost-centric SSD performance to new heights. On top of its refined power efficiency and advanced cost-effective DRAM-less design, Phison PS5027-E27T practically eliminates the need to choose between high-performance and affordable pricing for PC builders and consumers.

Application

High-performance PCs / Workstations

Gaming PCs

Gaming Consoles

Product Features

Market-leading Performance

Manufactured using TSMC's 12nm process technology, PS5027-E27T 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 PS5027-E27T handles application payloads immaculately with minimal latency.

Superb Power Efficiency

Through its DRAM-less configuration and a range of design enhancements, PS5027-E27T offers up to a 15% reduction in power consumption compared to DRAM-equipped solutions. With advanced power management measures such as support of the L1.2 low power state, PS5027-E27T is able to effectively help motherboards with power reduction during idle periods.

Outstanding Cost-effectiveness

As a cutting-edge DRAM-less solution, PS5027-E27T not only saturates the PCIe Gen4 interface bandwidth as well as any DRAM-boosted solution does, but it does so while retaining compelling cost-savings, creating invaluable design-in opportunities in cost-sensitive consumer markets.

Phison 5th Generation LDPC ECC Engine

Phison's proprietary fifth-generation ECC engine based on the LDPC coding scheme effectively maintains NAND flash data reliability. Relative to the prior generation, the 5th Gen engine now operates fully on 4KB-sized frames at high efficiency while supporting future-gen NAND flash from industry partners.

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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 5.0 and ONFi 5.0 - Flash I/O operating voltage supply 1.2V
Data Reliability	- Phison 5th 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

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Solutions

PS5027-E27T

SSD Solutions	PS5027-E27T			
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 / QLC			
Performance [2][3]				
Sequential Read	7200 MB/s	7400 MB/s	7400 MB/s	7200 MB/s
Sequential Write	4300 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	750K IOPS	850K IOPS	950K IOPS	1400K IOPS
Power Consumption [4]				
Supply Voltage	M.2 3.3V ± 5%			
Active (Average)	5150 mW	5600 mW	5700 mW	5900 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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