



Gen4 Marvel Built For All

Phison E21T is a market-proven DRAM-less PCIe Gen4 SSD controller IC solution that has taken cost-centric SSD performance to new heights. On top of its refined power efficiency and advanced cost-effective DRAM-less design, E21T achieves ceiling-touching DRAM-less grade performance. In addition, with rich options in form factor deployment, E21T is a versatile solution designed to elevate gaming, automotive, and industrial applications.



Application

- Gaming PCs/ gaming consoles
- Cutting-edge consumer mobile devices
- High-end automotive applications
- Wide-ranging industrial/ medical/ edge devices

Product Features

Outstanding Cost-effectiveness

As a refreshed, fully mature DRAM-less PCIe Gen4 solution, E21T is able to retain top-notch performance reaching above 5000MB/s in sequential operations while enabling compelling cost-savings to create invaluable design-in opportunities in cost-sensitive consumer markets.

Superb Power Efficiency

As Phison's first DRAM-less PCIe Gen4 SSD controller IC manufactured on TSMC's 12nm process technology, E21T provides up to 25% reduction in power consumption over the previous generation. In terms of advanced power management measures, the support of L1.2 low power state spares ample allowance for device battery life.

Deployment Versatility

Meant for storage in multifarious electronic devices and subsystems from the PCIe Gen4 era, E21T is enabled on multiple form factors for flexible utility and adaptability. From generic M.2 and BGA SSDs to CFexpress cards, modules adopting E21T takes on wide-ranging industrial and automotive applications as well as cutting-edge consumer mobile devices.

Extensive Compliance

The E21T solution portfolio has undergone various certification programs and compliance verifications from industry giants like Intel, AMD, and Google, as well as renowned third-party institutions such as UNH-IOL and Automotive Electronics Council(AEC). Let Phison E21T connect you to the world and create the synergy you need.

CONTROLLER

PS5021-E21T

Features	Specifications
Host Interface	<ul style="list-style-type: none">- 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 1.4- Host Memory Buffer (HMB) support
Processor	<ul style="list-style-type: none">- Single-CPU architecture with built-in 32-bit microcontroller- TSMC 12nm process technology
Flash Controller	<ul style="list-style-type: none">- Up to 4 Channels with 16 Chips Enable (CE)- Flash transfer rate up to 1,600MT/s- Capacity up to 4TB- Support 3D TLC and QLC NAND flash memory- Compliance with Toggle 3.0 and ONFi 4.2- Flash I/O operating voltage supply 1.2V
DRAM Controller	<ul style="list-style-type: none">- DRAM-less
Data Reliability	<ul style="list-style-type: none">- Phison 4th generation LDPC ECC & RAID ECC- DDR ECC engine- End-To-End Data Path Protection
Security	<ul style="list-style-type: none">- Pyrite- AES 256- SHA 512- RSA 4096- TCG Opal
Performance	<ul style="list-style-type: none">- Sequential Read up to 5,000MB/s- Sequential Write up to 4,800MB/s- 4K Random Read up to 800K IOPS- 4K Random Write up to 950K IOPS
Power Management	<ul style="list-style-type: none">- L1.2 < 5mW
Temperature Range	<ul style="list-style-type: none">- Operating range: 0~70 °C- Storage range: -40~85 °C- Operating junction temperature: -40~125 °C
Package	<ul style="list-style-type: none">- 198-ball HSFCCSP, 7.5 mm x 12 mm
Peripheral	<ul style="list-style-type: none">- 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

Solutions

PS5021-E21T

SSD Solutions	PS5021-E21T			
Capacity ⁽¹⁾	250GB	500GB	1TB	2TB
Interface	PCIe Gen 4.0 x4 NVMe 1.4			
Form Factor	M.2 2280 / M.2 2230 / BGA SSD / CFX			
NAND Flash	3D TLC	3D TLC	3D TLC	3D TLC
Performance ⁽²⁾⁽³⁾				
Sequential Read	4700 MB/s	5000 MB/s	5000 MB/s	4900 MB/s
Sequential Write	1950 MB/s	3800 MB/s	4800 MB/s	4750 MB/s
4K Random Read	220K IOPS	440K IOPS	800K IOPS	800K IOPS
4K Random Write	470K IOPS	920K IOPS	950K IOPS	950K IOPS
Power ⁽⁴⁾				
Supply Voltage	M.2 3.3V ± 5%			
Active (Average)	3.2 W	4.0 W	4.3 W	5.0 W
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			
Certification	-RoHS -WHQL			
Reliability & Warranty				
TBW ⁽⁵⁾	200 TB (5-year)	300 TB (5-year)	600 TB (5-year)	1200 TB (5-year)
Warranty	5 Years			
MTBF	1.5 million hours			
UBER	<10 ⁻¹⁶ bits			
Advanced Features				
<ul style="list-style-type: none"> - 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 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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