



A Bang-For-Buck For Everything Gen3

Phison PS5013-E13T (Phison E13T) is an entry-level, DRAM-less PCIe Gen3 SSD controller IC solution that balances cost efficiency with potent Gen3 throughput. As one of Phison's earliest launched PCIe Gen3 solutions, the E13T is enabled with rich options of form factors to tackle a wide variety of client and mobile device deployment needs from high-end smartphones and camera devices.

Applications

- Consumer Mobile Devices
- Multi-function Printers (MFPs)
- Point of Sale (POS) Edge Systems
- High-end Digital Cameras



Product Features

Outstanding Cost-effectiveness

As an entry-level DRAM-less Gen3 solution, the E13T delivers excellent all-around performance and stands tall as a solid upgrade to PCIe. Relative to more premium selections, the E13T enables compelling cost-savings to create invaluable design-in opportunities in cost-sensitive consumer markets.

Phison 4th Generation LDPC ECC engine

Phison's proprietary fourth-generation ECC engine based on the LDPC coding scheme effectively maintains NAND flash data reliability. Relative to the prior generation, the 4th Gen engine grants extended NAND flash variation support, working flexibly with a wide range of solutions including those based on QLCs.

Deployment Versatility

The E13T is enabled on multiple form factors for flexible utility and adaptability. From generic M.2 and BGA SSDs to CFexpress cards, modules adopting Phison E13T takes on wide-ranging commercial applications as well as cutting-edge consumer mobile devices.

End-to-End Data Path Protection

From the entry through PHY to the access of NAND flash memory, data packages go through a series of encryption/decryption using various coding schemes, including but not limited to AES, CRC, and SEDEC, to gain a multi-layered protection over the course of delivery.

CONTROLLER

PS5013-E13T

Features	Specifications
Host Interface	<ul style="list-style-type: none">- PCIe 3.0 x4 (Bandwidth: 8GT/s x4)- Backward compatible with existing PCIe generation transfer rates- Compliance with PCI Express Base Specification Revision 3.1- Compliance with NVMe 1.3- Host Memory Buffer (HMB) support
Processor	<ul style="list-style-type: none">- Single-CPU architecture with built-in 32-bit microcontroller- TSMC 28nm process technology
Flash Controller	<ul style="list-style-type: none">- Up to 4 Channels with 16 Chip Enable (CE) counts- Flash transfer rate up to 800MT/s- Capacity up to 2TB- 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
Data Reliability	<ul style="list-style-type: none">- Phison 4th generation LDPC ECC & RAID ECC- End-to-End Data Path Protection
Security	<ul style="list-style-type: none">- Pyrite- AES 256- SHA 160/256/512- RSA 2048- TCG Opal
Performance	<ul style="list-style-type: none">- Sequential Read up to 2500MB/s- Sequential Write up to 2100MB/s- 4K Random Read up to 230K IOPS- 4K Random Write up to 400K 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
Package	<ul style="list-style-type: none">- 216-ball TFBGA, 8 mm x 12 mm- 198-ball HSTFBGA, 7 mm x 11 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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SOLUTIONS

PS5013-E13T

Capacity ⁽¹⁾	128GB	256GB	512GB	1024GB	2048GB
Interface	PCIe Gen 3.0 x4 NVMe 1.3				
Form Factor	M.2 2280/2242/2230, BGA SSD, CFexpress				
NAND Flash	3D TLC / 3D QLC				
Performance ⁽²⁾					
Sequential Read	2200 MB/s	2300 MB/s	2500 MB/s	2500 MB/s	2500 MB/s
Sequential Write	600 MB/s	1200 MB/s	2100 MB/s	2100 MB/s	2100 MB/s
4K Random Read	85K IOPS	150K IOPS	210K IOPS	215K IOPS	230K IOPS
4K Random Write	130K IOPS	250K IOPS	400K IOPS	400K IOPS	400K IOPS
Power Consumption ⁽³⁾					
Supply Voltage	M.2 3.3V ± 5%				
Active (Average)	3.15W	3.45W	3.5W	3.68W	3.75W
Idle	30mW	30mW	30mW	30mW	30mW
Low Power PS4 (L1.2)	5mW	5mW	5mW	5mW	5mW
Environmental					
Operating Temperature	0°C - 70°C				
Non-Operating Temperature	-40°C - 85°C				
Reliability & Warranty					
TBW (Max) ⁽⁵⁾	100TB	200TB	400TB	800TB	1600TB
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 - Static & Dynamic SLC Cache Support - SmartZIP™ Support 				

⁽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 JESD219A Standards



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