Cactus® Technologies

Cactus Technologies designs and manufactures the highest-endurance and most reliable industrial flash storage devices on the market. Four product lines, each with multiple form factors, allow the system designer to select the right solution to meet their reliability and budget requirements.

Cactus has a solution to support the diverse needs of OEMs, VARs, and Industrial companies worldwide.

Product Lines

Industrial Grade (SLC) Embedded Flash Storage Devices

- Long Life Cycles – Fixed BOM Control
- Rugged, reliable, based on select SLC NAND components
- Industrial strength wear leveling and defect management
- Available in a wide variety of industry-standard form factors

- Industry Leading
    - Handling unexpected power interruption
    - Endurance, data integrity, quality & reliability
    - Temperature options (-40C to 85C)
    - SMART – Self Monitoring Analysis and Reporting Technology for useable life prediction
    - Optional ATA Security, and other features on select products

Industrial pSLC

- Over 6 times the endurance of Industrial MLC
- Based on pSLC NAND with Fixed BOM Control
- Several form factors to choose from

Industrial MLC

- Most reliable MLC NAND products with Fixed BOM Control
- Qualified and tested to industry-leading MLC specs
- Available in a wide variety of industry-standard form factors

Industrial 3D

- Most reliable 3D BICS NAND products with Fixed BOM Control
- The lowest-cost solution offered in the Cactus lineup
- Extensively tested Industrial 3D NAND
- Available in several industry-standard form factors

Cactus USA
americas@cactus-tech.com
(512) 775-0746

Cactus Technologies® Limited
info@cactus-tech.com
(852) 2797-2261

www.cactus-tech.com

Industrial Grade SLC

Industrial Grade Embedded Flash Storage Devices offer the highest specifications for Ruggedness, Temperature, Altitude, Endurance, and Reliability. They are ideal for the most demanding industrial and OEM applications and only use SLC (Single Level Cell) NAND memory.

Product	Compact-Flash	SD	SD	SDChip	microSD	USB Flash Drive	CFast	mSATA	2.5"SATA SSD
Series	303-32	806-32	807	806-32	803M	300	X00S	940S	940S
Capacities (Min)	512MB	512MB	4GB	512MB	1GB	512MB	1GB	8GB	8GB
Capacities (Max)	16GB	8GB	32GB	4GB	4GB	32GB	64GB	128GB	256GB
Sequential Transfers (Min)	25 MB/s	16 MB/s	30 MB/s	15 MB/s	17 MB/s	25 MB/s	135 MB/s	415 MB/s	405 MB/s
Sequential Transfers (Max)	35 MB/s	20 MB/s	35 MB/s	20 MB/s	20 MB/s	30 MB/s	320 MB/s	540 MB/s	540 MB/s

ATA/IDE Interface Devices

The ATA/IDE interface, aka PATA (Parallel ATA), was developed in the early 1990s, and the CompactFlash form factor is still used in many industrial designs today.

SD Interface Devices

The SD interface was developed in the late 1990s to accommodate small form factor designs with a low pin count bus. Many embedded processors and microcontrollers have built-in SD interfaces for easy implementation. Cactus offers SD & microSD cards, as well as a solderable SDChip.

SATA Interface Devices

The SATA interface, developed in 2003, has been the workhorse for the embedded OEM industry, with much higher performance than the previous ATA/IDE and SD interfaces. Cactus offers CFast, mSATA, and 2.5" SATA SSD form factors.

USB Interface Device

The USB interface was developed in the mid 1990s and is best known for removable USB Flash Drives. As with the SD interface, many processors have an integrated USB interface which is ideal for the Cactus USB Flash Drive.

PCIe Interface Devices

The PCIe interface offers an extremely high-performance connection between the host system and the flash storage device. Cactus offers the PCIe Interface on multiple M.2 form factors, a CFexpress card, and our PCIeChip embedded solution.

Customization Services: Custom Labeling & Preloading Content • Custom firmware/ID Custom Feature Sets • Complete Custom Products

Industrial 3D

Cactus Industrial 3D products are based on Kioxia INDUSTRIAL 3D BICS NAND rated at -40C to 85C operation with a much higher endurance and reliability than standard 3D NAND. They are designed for applications that require high performance at a lower cost per megabyte. Industrial 3D products are available in a diverse range of form factors and capacities, with extended temperature offerings for wide temperature environments.

Product	SD	microSD	CFast	CFexpress	PCIeChip	M.2 PCIe 2242	M.2 PCIe 2280	2.5" SATA SSD
Series	290	290M	290S	290P	290PC	290P	290P	290S
Capacities (Min)	64GB	64GB	64GB	64GB	128GB	64GB	128GB	128GB
Capacities (Max)	256GB	256GB	1TB	1TB	512GB	1TB	2TB	2TB
Sequential Transfers (Read)	87 MB/s	85 MB/s	540 MB/s	1.6 GB/s	1.8 GB/s	2.9 GB/s	2.9 GB/s	550 MB/s
Sequential Transfers (Write)	52 MB/s	55 MB/s	510 MB/s	1.6 GB/s	1.2 GB/s	1.9 GB/s	1.9 GB/s	525 MB/s

M.2 PCIe Heat Sink Option
Heat Sinks allow for full-speed operation at wide temperature ranges of -40C to 85C

The Cactus Industrial pSLC products are based on pSLC (Pseudo-SLC) NAND memory with over 6 times the Endurance of Industrial MLC products which use MLC NAND.

Industrial pSLC

Product	SD	SD	microSD	M.2 SATA 2242	M.2 SATA 2260	CFast	CFast	mSATA	CF-express	M.2 PCIe 2242	M.2 PCIe 2280	2.5" SATA SSD	2.5" SATA SSD
Series	245	295	295M	245S	245S	245S	295S	245S	295P	295P	295P	245S	295S
Capacities (Min)	4GB	16GB	16GB	4GB	4GB	4GB	16GB	4GB	16GB	16GB	32GB	8GB	32GB
Capacities (Max)	64GB	64GB	64GB	128GB	128GB	64GB	256GB	256GB	256GB	256GB	512GB	512GB	512GB
Sequential Transfers (Read)	80 MB/s	87 MB/s	95 MB/s	540 MB/s	540 MB/s	350 MB/s	545 MB/s	540 MB/s	1.6 GB/s	2.4 GB/s	2.4 GB/s	540 MB/s	550 MB/s
Sequential Transfers (Write)	65 MB/s	76 MB/s	70 MB/s	450 MB/s	450 MB/s	310 MB/s	510 MB/s	450 MB/s	1.6 GB/s	1.9 GB/s	1.9 GB/s	450 MB/s	510 MB/s

Cactus Extras

- Pre-Sales Engineering Design Assistance
- Post-Sales Applications Engineering Support
- Leading Industrial Grade Flash Storage Supplier
- Development Adapters
- Bonded Inventory
- Extended Last-Time-Shipments Available

Industrial MLC

The Cactus Industrial MLC products are based on MLC NAND memory and offer a cost-effective solution for budget-limited applications. They are ideal for lower endurance applications.

Product	Compact-Flash	SD	microSD	CFast	mSATA	M.2 SATA 2242	M.2 SATA 2260	M.2 SATA 2280	2.5" SATA SSD
Series	240	240	240M	240S	240S	240S	240S	240S	240S
Capacities (Min)	4GB	4GB	8GB	8GB	8GB	8GB	8GB	64GB	16GB
Capacities (Max)	128GB	128GB	32GB	128GB	512GB	128GB	128GB	256GB	1TB
Sequential Transfers (Read)	110 MB/s	80 MB/s	85 MB/s	530 MB/s	560 MB/s	540 MB/s	540 MB/s	540 MB/s	560 MB/s
Sequential Transfers (Write)	80 MB/s	40 MB/s	50 MB/s	330 MB/s	360 MB/s	450 MB/s	450 MB/s	450 MB/s	460 MB/s

Product Grade Selector

Industrial Grade	Industrial pSLC	Industrial MLC	Industrial 3D	Consumer	
SLC Single Level Cell	pSLC Pseudo SLC	MLC Multi Level Cell	Industrial 3D BICS	3D TLC/QLC	NAND Type
1	1	2	3	3	Bits/Cell
70K / 60K	20K	3K	3K	1K	Endurance Cycles
★★★★★	★★★☆☆	★★☆☆☆	★★⯪☆☆	★⯪☆☆☆	Reliability
★★★★★	★★★☆☆	★★☆☆☆	★★⯪☆☆	★⯪☆☆☆	Data Retention
★★★★★	★★★⯪☆	★★★⯪☆	★★★⯪☆	☆☆☆☆☆	Life Cycle
✓	✓	✓	✓	✕	Locked-BOM
$$$$	$$$	$$	$$	$	Cost

Due to the brevity of this brochure, not all details can be displayed. For a complete specification on a given product, please visit https://www.cactus-tech.com/contact-us/talk-to-a-cactus-expert to contact us for a product manual.

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