

## 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         | <b>M.2 PCIe Heat Sink Option</b><br>Heat Sinks allow for full-speed operation at wide temperature ranges of -40C to 85C |
| 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      |                                                                                                                         |

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.

| 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 | Industrial pSLC |
|------------------------------|---------|---------|---------|---------------|---------------|----------|----------|----------|------------|---------------|---------------|---------------|---------------|-----------------|
| 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



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.

## Industrial MLC

|                              |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 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<br>Single Level Cell | pSLC<br>Pseudo SLC | MLC<br>Multi Level Cell | Industrial<br>3D BICS | 3D<br>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.

**Cactus**<sup>®</sup>  
Technologies

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

**Cactus Technologies<sup>®</sup> Limited**  
info@cactus-tech.com  
(852) 2797-2261

[www.cactus-tech.com](http://www.cactus-tech.com)