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1.Introduction to Cactus Technologies Industrial Grade DOM -3XX Series Products

Features:

- Solid state design with no moving parts
- Plugs into industry standard IDE 40/44 pin sockets
- Supports ATA PIO Modes 0-4
- Supports MultiWord DMA Modes 0-2
- Supports UDMA Modes 0-4
- Supports S.M.A.R.T. Feature Set
- High reliability, MTBF > 4,000,000 hrs.
- Enhanced error correction, < 1 error in 10^{14} bits read
- Comes in Vertical, Horizontal Left and Horizontal Right configurations
- Dual voltage support: 3.3V/5.0V

Overview:

Cactus Technologies® DiskOnModule (DOM) is a low capacity solid-state flash memory product that complies with the ANSI ATA standard and is electrically compatible with an IDE disk drive. Cactus Technologies® DOMs provide up to 8GB of formatted storage capacity and is designed to plug in directly to IDE connectors on an industrial PC motherboard. Cactus Technologies® DOMs are designed to be used in applications which requires a low capacity solid state disk that is IDE compatible.

Cactus Technologies® Industrial Grade DOM product uses high quality flash memory from well known vendors, such as Toshiba Corporation. In addition, it includes an on-drive intelligent controller that manages interface protocols, data storage and retrieval as well as ECC, defect handling and diagnostics, power management, and clock control.

1.1. Supported Standards

Cactus Technologies® DOM is fully electrically compatible with the following specification:

- ATA 5 Specification published by ANSI: X3.221 AT Attachment Interface for Disk Drives

1.2. Product Features

Cactus Technologies® Industrial DOM contains a high level, intelligent controller. This intelligent controller provides many capabilities including the following:

- Standard ATA register and command set (same as found on most magnetic disk drives).
- Management of erasing and programming the flash memory independent of the host system
- Sophisticated defect managing capabilities (similar to magnetic disk drives).
- Sophisticated system for error recovery using powerful error correction code (ECC).
- Intelligent power management for low power operation.

1.2.1. Host and Technology Independence

Cactus Technologies® Industrial DOM appears as a standard ATA disk drive to the host system. The drive utilizes a 512-byte sector which is the same as that in an IDE magnetic disk drive. To write or read a sector (or multiple sectors), the host computer software simply issues an ATA Read or Write command to the drive as per the ATA protocol. The host software then waits for the command to complete. The host system does not get involved in the details of how the flash memory is erased, programmed or read as this is all managed by the built-in controller in the drive. Also, with the intelligent on-board controller, the host system software will not require changing as new flash memory evolves. Thus, systems that support the Cactus Technologies® Industrial DOM products today will continue to work with future Cactus Technologies® Industrial DOMs built with new flash technology without having to update or change host software.

1.2.2. Defect and Error Management

Cactus Technologies® Industrial DOM contains a sophisticated defect and error management system similar to those found in magnetic disk drives. The defect management is completely transparent to the host and does not consume any user data space.

The soft error rate for Cactus Technologies® Industrial DOMs is much lower than that of magnetic disk drives. In the extremely rare case where a read error does occur, the drive has sophisticated ECC to recover the data.

These defect and error management systems, coupled with the solid-state construction, give Cactus Technologies® Industrial DOMs unparalleled reliability.

1.2.3. Intelligent Power Management

Cactus Technologies® Industrial DOM employs sophisticated power management algorithms to conserve power. Upon completion of a command, the drive will automatically enter sleep mode if no further commands are received. In most situations, the drive will be in sleep mode except when the host is accessing it, thus conserving power.

When the drive is in sleep mode, any command issued to the drive will cause it to exit sleep and respond.

2.Power Supply Requirements

Cactus Technologies® Industrial DOM is a dual voltage product, which means it will operate at a voltage range of 3.30 volts ±10% or 5.00 volts ± 10%.Product Specifications

For all the following specifications, values are defined at ambient temperature and nominal supply voltage unless otherwise stated.

2.1. System Environmental Specifications

Table 2-2.1. Environmental Specifications

		Cactus Technologies® DOM
Temperature	Operating:	0° C to +70° C (Standard) -45° C to +90° C (Extended)
Humidity	Operating & Non-Operating:	8% to 95%, non-condensing
Acoustic Noise		0 dB
Vibration	Operating & Non-Operating:	20 G MIL-STD-883G Method 2005.2 condition A
Shock	Operating & Non-Operating:	3000G MIL-STD-883G Method 2002.3 condition C
Altitude (relative to sea level)	Operating & Non-Operating:	100,000 feet maximum

2.2. System Power Requirements

Table 2-2.2. Power Requirements

		Cactus Technologies® Industrial DOM
DC Input Voltage (VCC) **100 mV max. ripple (p-p)**		3.3V ±10% or 5V ±10%

(Maximum Average Value) See Notes.	Sleep: Reading: Writing:	500 µA 220 mA 180 mA

NOTES: All values quoted are worst case at low temperature and high supply voltage unless otherwise stated.

Sleep mode is specified under the condition that all drive inputs are static CMOS levels and in a "Not Busy" operating state.

2.3. System Performance

All performance timings are typical values under normal operating conditions and assuming the drive controller is in the default (i.e., fastest) mode.

Table 2-2.3. Performance

Start Up Times	Reset to ready:	35 msec typical
Read Transfer Rate		35.0 MBytes/sec
Write Transfer Rate		20.0 MBytes/sec
Controller Overhead	Command to DRQ	2 msec maximum

2.4. System Reliability

Table 2-2.4. Reliability

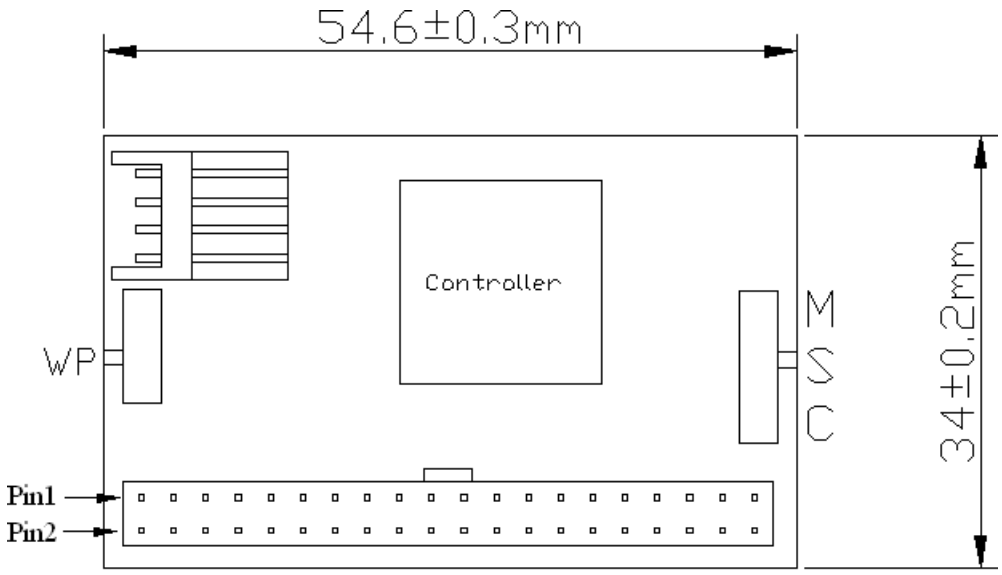
MTBF (@ 25°C)	> 4,000,000 hours
Data Reliability	< 1 non-recoverable error in 10^{14} bits READ
Endurance:	> 2,000,000 erase/program cycles

2.5. Physical Specifications

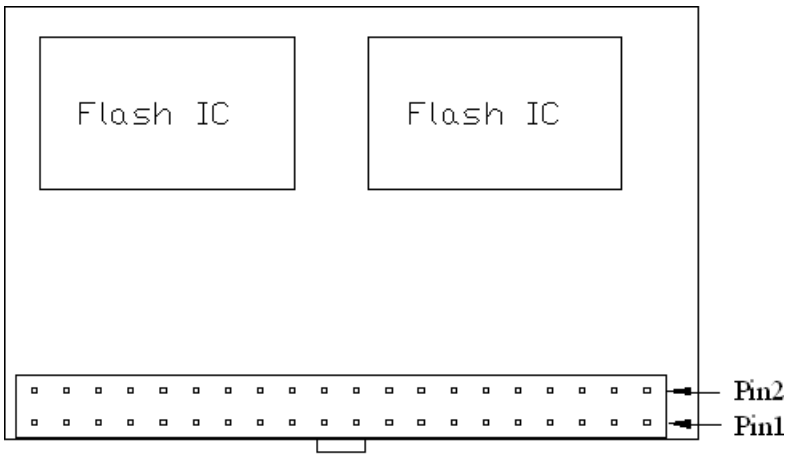
The following sections provide the physical specifications for Cactus Technologies® Industrial DOM products.

2.5.1. DOM Physical Specifications

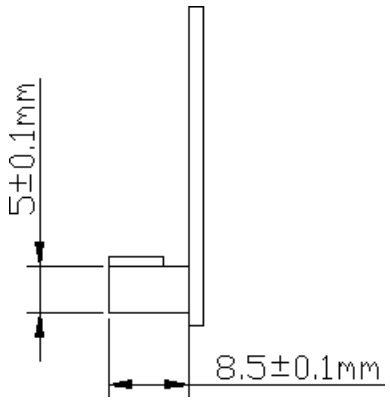
Refer to Figure 2-1 for Cactus Technologies® 40-pin DOM physical specifications and dimensions and Figure 2-2 for Cactus Technologies® 44-pin DOM physical specifications.



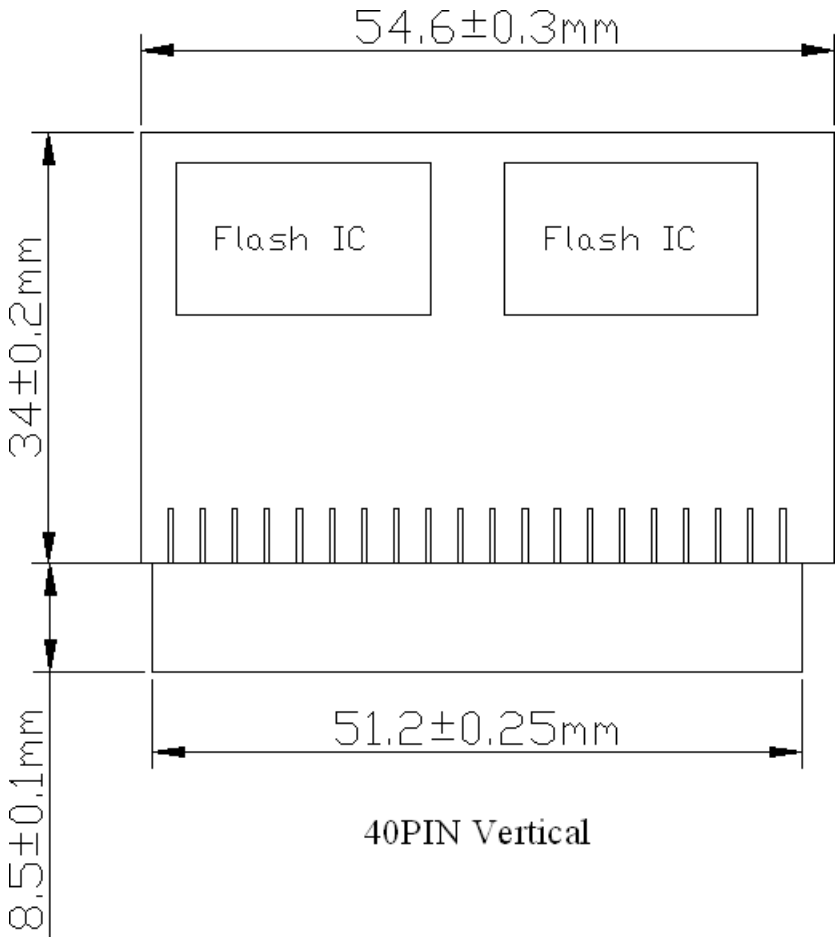
Horizontal Version 40PIN,Left-Oriented



Horizontal Version 40PIN,Right-Oriented



Height of 40-pin Horizontal DOM



40PIN Vertical

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