



# Industrial CFast Specification

(ACHIEVER SERIES, SLC)

**Version 1.5**

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# 1. GENERAL DESCRIPTION



## 1.1. Introduction

FLEXON's ACHIEVER CFast has SATA III interface, and is fully compliant with standard CFast Form Factor. It supports good performance, high reliability and low power management. It is suitable for heavy-loading or multi-tasking applications.

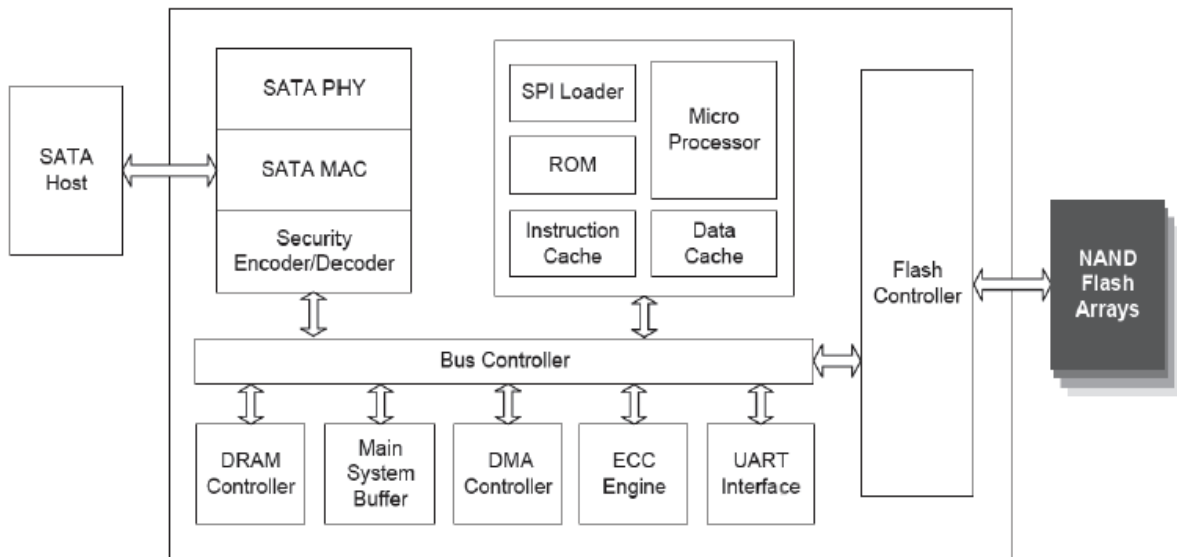


Figure 1-1 ACHIEVER CFast Controller Block Diagram

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## 1.2. Product Overview

- ❖ **Flash**
  - SLC
- ❖ **Capacity**
  - 4GB up to 32GB
- ❖ **SATA Interface**
  - Compliant with SATA Revision 3.1
  - Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
- ❖ **ECC Scheme**
  - Up to 66 bits error in 1K Byte data
- ❖ **UART Function**
- ❖ **GPIO**
- ❖ **Support SMART and TRIM commands**
- ❖ **Low Power Management**
- ❖ **Internal data shaping technique increase data endurance**
- ❖ **Global Wear Leveling Algorithm**
- ❖ **Temperature Range**
  - Operation (Silver) : 0°C ~ 70°C
  - Operation (Diamond) : -40°C ~ 85°C
  - Storage: -55°C ~ 95°C
- ❖ **RoHS Compliant**

### 2.1. Performance

Table 2-1 Performance of ACHIEVER CFast

Capacity	Sequential	
	Read (MB/s)	Write (MB/s)
4GB	42	38
8GB	85	77
16GB	168	150
32GB	175	160

**NOTES:**

1. The performance was measured using CrystalDiskMark with SATA 6Gbps host.
2. Performance may differ according to flash configuration and platform.

### 2.2. Power

Table 2-2 Supply Voltage of ACHIEVER CFast

Parameter	Rating
Operating Voltage	3.3V +/- 5%

Table 2-3 Power Consumption of ACHIEVER CFast

Parameter	Power Consumption
Idle (max.)	0.42 W
Active (max.)	1.3 W

**NOTE:**

Power Consumption may differ according to flash configuration and platform.



## 2.3. TBW (Terabytes Written)

Capacity	TBW
4GB	120
8GB	240
16GB	481
32GB	962

### NOTES:

1. TBW may differ according to flash configuration and platform.
2. Samples were tested under JESD218A endurance test method and JESD219A endurance workloads specification.

## 2.4. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The predicted result of FLEXXON's ACHIEVER CFast is more than 3 million hours.

## 2.5. Data Retention

- 10 years if > 90% life remaining (@25C)
- 1 year if < 10% life remaining (@25C)

### 3. ENVIRONMENTAL SPECIFICATIONS



Test Items	Test Conditions
Storage Temperature	-55°C ~ 95°C
Operating Temperature	Silver Grade: 0°C ~ 70°C Diamond Grade: -40°C ~ 85°C
Storage Humidity	Silver Grade: 40°C, 95% RH Diamond Grade: 55°C, 95% RH
Operating Humidity	Silver Grade: 40°C, 93% RH Diamond Grade: 55°C, 95% RH
Shock	1000G, Half Sin Pulse Duration 0.5ms
Vibration	80Hz ~ 2000Hz/20G, 20Hz ~ 80Hz/1.52mm, 3 axis/60min
Drop	80cm free fall, 6 face of each unit, 2 times each
Bending	≥ 20N, Hold 1 min/5 times
ESD	24°C, 49% RH, +/-4KV 25 times, Air +/-8KV 10 times

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**Table 4-1 Supported ATA Command Set**

#	Command	Code	Protocol
<b>General Feature Set</b>			
	Execute Drive Diagnostic	90h	Device diagnostic
	Flush Cache	E7h	Non-data
	Identify Device	ECh	PIO data-in
	Initialize Drive Parameters	91h	Non-data
	Read DMA	C8h	DMA
	Read Log Ext	2Fh	PIO data-in
	Read Multiple	C4h	PIO data-in
	Read Sector(s)	20h	PIO data-in
	Read Verify Sector(s)	40h or 41h	Non-data
	Set Feature	EFh	Non-data
	Set Multiple Mode	C6h	Non-data
	Write DMA	CAh	DMA
	Write Multiple	C5h	PIO data-out
	Write Sector(s)	30h	PIO data-out
	NOP	00h	Non-data
	Read Buffer	E4h	PIO data-in
	Write Buffer	E8h	PIO data-out
<b>Power Management Feature Set</b>			
	Check Power Mode	E5h or 98h	Non-data
	Idle	E3h or 97h	Non-data
	Idle Immediate	E1h or 95h	Non-data
	Sleep	E6h or 99h	Non-data
	Standby	E2h or 96h	Non-data
	Standby Immediate	E0h or 94h	Non-data



<b>Security Mode Feature Set</b>		
Security Set Password	F1h	PIO data-out
Security Unlock	F2h	PIO data-out
Security Erase Prepare	F3h	Non-data
Security Erase Unit	F4h	PIO data-out
Security Freeze Lock	F5h	Non-data
Security Disable Password	F6h	PIO data-out
<b>SMART Feature Set</b>		
SMART Disable Operations	B0h	Non-data
SMART Enable/Disable Autosave	B0h	Non-data
SMART Enable Operations	B0h	Non-data
SMART Execute Off-Line Immediate	B0h	Non-data
SMART Read Log	B0h	PIO data-in
SMART Read Data	B0h	PIO data-in
SMART Read Threshold	B0h	PIO data-in
SMART Return Status	B0h	Non-data
SMART Save Attribute Values	B0h	Non-data
SMART Write Log	B0h	PIO data-in
<b>Host Protected Area Feature Set</b>		
Read Native Max Address	F8h	Non-data
Set Max Address	F9h	Non-data
Set Max Set Password	F9h	PIO data-out
Set Max Lock	F9h	Non-data
Set Max Freeze Lock	F9h	Non-data
Set Max Unlock	F9h	PIO data-out
<b>48-bit Address Feature Set</b>		
Flush Cache Ext	EAh	Non-data
Read Sector(s) Ext	24h	PIO data-in
Read DMA Ext	25h	DMA
Read Multiple Ext	29h	PIO data-in
Read Native Max Address Ext	27h	Non-data
Read Verify Sector(s) Ext	42h	Non-data
Set Max Address Ext	37h	Non-data
Write DMA Ext	35h	DMA
Write Multiple Ext	39h	PIO data-out
Write Sector(s) Ext	34h	PIO data-out
<b>NCQ Feature Set</b>		
Read FPDMA Queued	60h	DMA Queued

Write FPDMA Queued	61h	DMA Queued
<b>Others</b>		
Data Set Management	06h	DMA
Seek	70h	Non-data

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## 5. PIN ASSIGNMENT

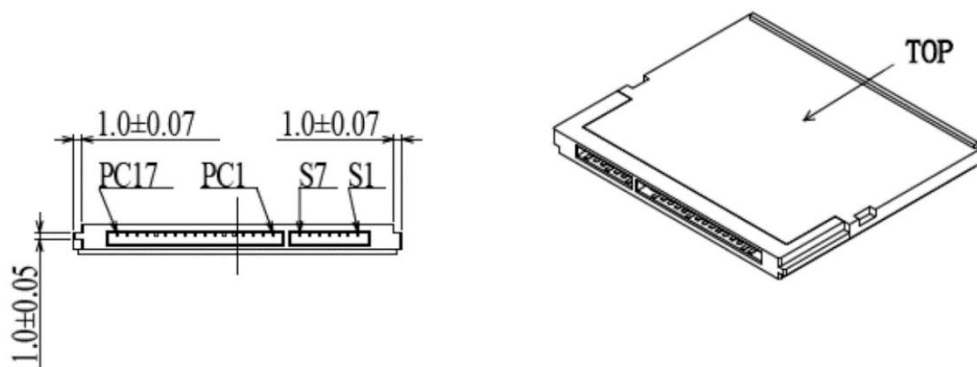


Figure 5-1 Pin Assignment of ACHIEVER CFast

Table 5-1 Pin Assignment and Function

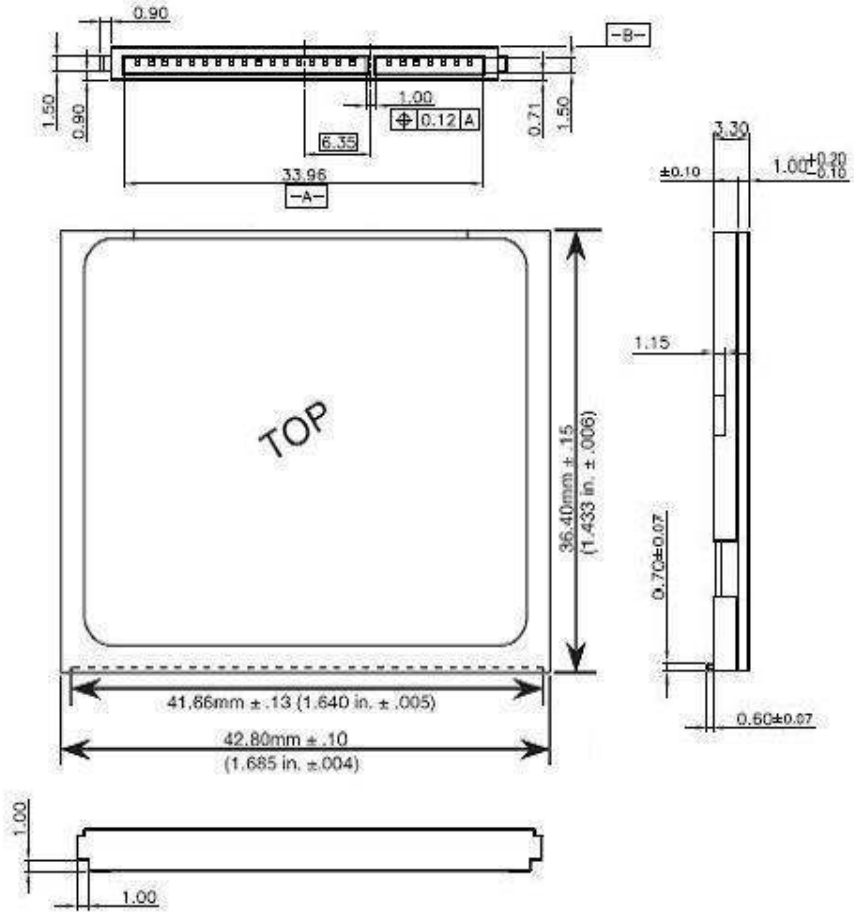
PIN #	Function
PC1	Card Detect Input
PC2	Device GND
PC3	DEVSLP (I) (O/3.3V)
PC4	N/C
PC5	N/C
PC6	N/C
PC7	Device GND
PC8	DASP (Default)
PC9	DASP (Optional)
PC10	W/P and Q/E Function (Optional)
PC11	N/C
PC12	GND
PC13	3.3V
PC14	3.3V
PC15	Device GND
PC16	Device GND
PC17	Card Detect Input

PIN #	Function
S1	Signal GND
S2	SATA A+
S3	SATA A-
S4	Signal GND
S5	SATA B+
S6	SATA B-
S7	Signal GND

**6. PHYSICAL DIMENSION**



Dimension: 36.4 mm(L) x 41.86 mm(W) x 3.30 mm(H)



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## 7. ORDERING INFORMATION



Capacity	MPN (Diamond Grade)	MPN (Silver Grade)
4GB	FSSF004GSE-M100	FSSF004GSS-M100
8GB	FSSF008GSE-M100	FSSF008GSS-M100
16GB	FSSF016GSE-M100	FSSF016GSS-M100
32GB	FSSF032GSE-M100	FSSF032GSS-M100

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## Revision History

Revision	Date	Description
1.0	2017/04	First release
1.1	2017/10	Update performance, power and TBW
1.2	2019/08	Update capacity
1.3	2019/08	Update part number
1.4	2020/03	Update capacity
1.5	2020/11	Update capacity

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