



Industrial mSATA Specification

(ACHIEVER SERIES, MLC)

Version 1.4

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TABLE OF CONTENTS

1.	GENERAL DESCRIPTION	1
1.1.	Introduction.....	1
1.2.	Product Overview	2
2.	PRODUCT SPECIFICATIONS.....	3
2.1.	Performance	3
2.2.	Power	3
2.3.	TBW (Terabytes Written)	4
2.4.	MTBF	4
2.5.	Data Retention	4
3.	ENVIRONMENTAL SPECIFICATIONS.....	5
4.	ATA COMMANDS.....	6
5.	PIN ASSIGNMENT	8
6.	PHYSICAL DIMENSION	10
7.	ORDERING INFORMATION.....	11

1.1. Introduction

FLEXON's ACHIEVER mSATA has SATA III interface, and is fully compliant with standard mSATA form factor, known as JEDEC MO-300. It supports high performance, high reliability and low power management. It is suitable for heavy-loading or multi-tasking applications.

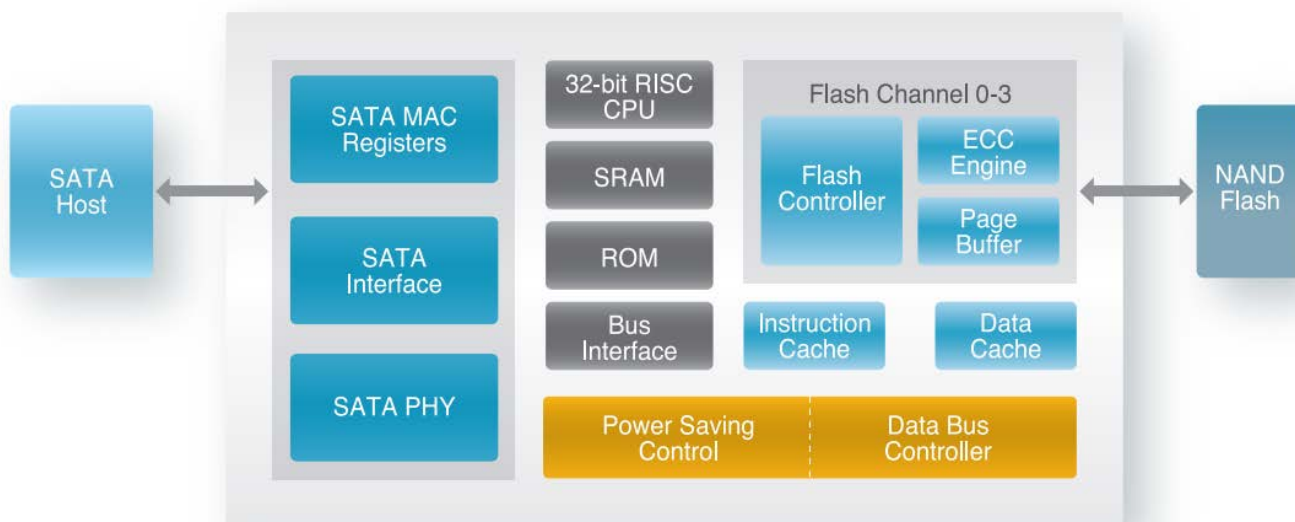


Figure 1-1 ACHIEVER mSATA Controller Block Diagram

1.2. Product Overview

- ❖ **Flash**
 - MLC
- ❖ **Capacity**
 - 8GB up to 256GB
- ❖ **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**
- ❖ **Hardware Write Protect (Optional)**
- ❖ **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 mSATA

Capacity	Sequential	
	Read (MB/s)	Write (MB/s)
8GB	142	30
16GB	284	59
32GB	483	89
64GB	482	90
128GB	486	175
256GB	500	310

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 mSATA

Parameter	Parameter Specifications
Input Voltage	3.3V +/-5%

Table 2-3 Power Consumption of ACHIEVER mSATA

Parameter	Specifications(W)
Idle (max.)	0.372W
Active (max.)	1.425W

NOTE:

1. Power Consumption may differ from flash configuration and platform.

2.3. TBW (Terabytes Written)

Capacity	TBW
8GB	15
16GB	29
32GB	58
64GB	117
128GB	235
256GB	464

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 mSATA 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	1500G, 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

Table 4-1 Supported ATA Command Set

#	Command	Code	Protocol
General Feature Set			
	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
Power Management Feature Set			
	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

Security Mode Feature Set		
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
SMART Feature Set		
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
Host Protected Area Feature Set		
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
NCQ Feature Set		
Read FPDMA Queued	60h	DMA Queued
Write FPDMA Queued	61h	DMA Queued

Table 5-1 Pin Assignment and Description of ACHIEVER mSATA

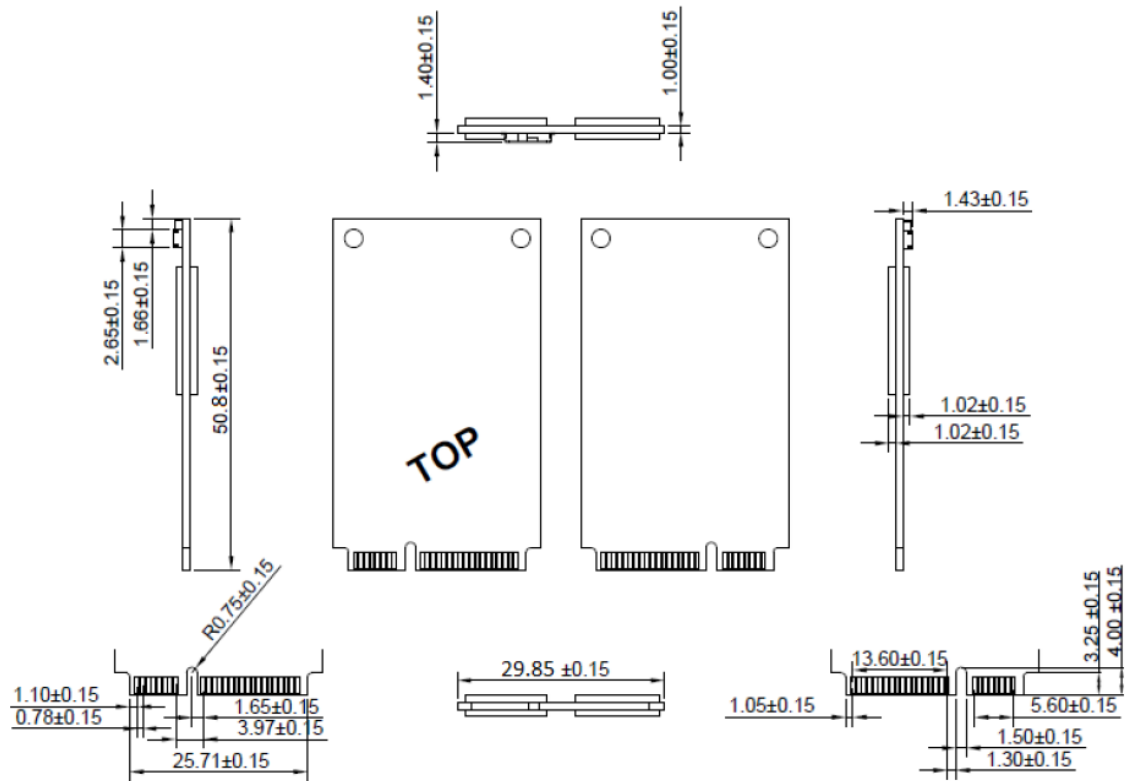
Pin #	mSATA Pin	Description
1	NC	No Connect
2	+3.3V	3.3V Source
3	NC	No Connect
4	GND	Ground
5	NC	No Connect
6	NC	No Connect
7	NC	No Connect
8	NC	No Connect
9	GND	Ground
10	NC	No Connect
11	NC	No Connect
12	NC	No Connect
13	NC	No Connect
14	NC	No Connect
15	DGND	Digital GND
16	NC	No Connect
17	NC	No Connect
18	GND	Ground
19	NC	No Connect
20	NC	No Connect
21	GND	Ground
22	NC	No Connect
23	TXP (out)	Host Receiver Differential Signal Pair
24	+3.3V	3.3V Source
25	TXN (out)	Host Receiver Differential Signal Pair
26	GND	Ground
27	GND	Ground
28	NC	No Connect
29	GND	Ground
30	NC	No Connect
31	RXN (in)	Host Transmitter Differential Signal Pair
32	NC	No Connect

Pin #	mSATA Pin	Description
33	RXP (in)	Host Transmitter Differential Signal Pair
34	GND	Ground
35	GND	Ground
36	NC	No Connect
37	GND	Ground
38	NC	No Connect
39	+3.3V	3.3V Source
40	GND	Ground
41	+3.3V	3.3V Source
42	NC	No Connect
43	NC	No Connect
44	DEVSLP	Enter/Exit DevSleep
45	NC	Reserved pin
46	NC	No Connect
47	NC	No Connect
48	NC	No Connect
49	DAS	Device Activity Signal
50	GND	Ground
51	PD	Presence Detect (0 ohm to 220 ohm)
52	+3.3V	3.3V Source

6. PHYSICAL DIMENSION



Dimension (mm): 50.8 (L) x 29.85 (W) x 3.83 (H)



7. ORDERING INFORMATION



Capacity	MPN (Diamond Grade)	MPN (Silver Grade)
8GB	FSSE008GME-M100	FSSE008GMS-M100
16GB	FSSE016GME-M100	FSSE016GMS-M100
32GB	FSSE032GME-M100	FSSE032GMS-M100
30GB	FSSE030GME-M100	FSSE030GMS-M100
64GB	FSSE064GME-M100	FSSE064GMS-M100
60GB	FSSE060GME-M100	FSSE060GMS-M100
128GB	FSSE128GME-M100	FSSE128GMS-M100
120GB	FSSE120GME-M100	FSSE120GMS-M100
256GB	FSSE256GME-M100	FSSE256GMS-M100
240GB	FSSE240GME-M100	FSSE240GMS-M100

Hardware Write Protect

Capacity	MPN (Diamond Grade)	MPN (Silver Grade)
8GB	FSSE008GME-M10K	FSSE008GMS-M10K
16GB	FSSE016GME-M10K	FSSE016GMS-M10K
32GB	FSSE032GME-M10K	FSSE032GMS-M10K
30GB	FSSE030GME-M10K	FSSE030GMS-M10K
64GB	FSSE064GME-M10K	FSSE064GMS-M10K
60GB	FSSE060GME-M10K	FSSE060GMS-M10K
128GB	FSSE128GME-M10K	FSSE128GMS-M10K
120GB	FSSE120GME-M10K	FSSE120GMS-M10K
256GB	FSSE256GME-M10K	FSSE256GMS-M10K
240GB	FSSE240GME-M10K	FSSE240GMS-M10K

Revision History

Revision	Date	Description
1.0	2016/01	First release
1.1	2016/10	Update Ordering Information
1.2	2016/12	Update performance and TBW
1.3	2017/01	Add Hardware Write Protect & Update Ordering Information
1.4	2019/08	Update capacity

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