



# Industrial 2.5" SATA SSD Specification

**(INSPIRE LIT Series, 3D TLC)**

**Version 1.1b**

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# 1. GENERAL DESCRIPTION

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## 1.1. Introduction

FLEXXON's INSPIRE LIT 2.5" SSD has SATA III interface, and is fully compliant with standard 2.5-inch Form Factor. It is DRAM-less design with good performance, compatibility & high reliability, suitable for embedded applications.

## 1.2. Product Overview

- ❖ **Flash**
  - 3D TLC
- ❖ **Capacity**
  - 64GB up to 2TB
- ❖ **SATA Interface**
  - Compliant with SATA Revision 3.2
  - Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
- ❖ **ECC Scheme**
  - INSPIRE LIT 2.5" SSD applies the LDPC (Low Density Parity Check) of ECC algorithm
- ❖ **UART Function**
- ❖ **GPIO**
- ❖ **Support SMART and TRIM commands**
- ❖ **Low Power Management**
- ❖ **Power Failure Protection**
- ❖ **Data shaping technique for enhanced data endurance**
- ❖ **Data Refresh technology for data integrity**
- ❖ **Global Wear Levelling Algorithm**
- ❖ **AES256 and TCG OPAL (Optional)**
- ❖ **Temperature Range**
  - Operation (Silver) : 0°C ~ 70°C
  - Operation (Diamond) : -40°C ~ 85°C
  - Operation (Extended) : -45°C ~ 95°C
  - Storage: -55°C ~ 95°C
- ❖ **RoHS Compliant**

## 2. PRODUCT SPECIFICATIONS



### 2.1. Performance

**Table 2-1 Performance of INSPIRE LIT 2.5" SSD**

Capacity	Sequential	
	Read (MB/s)	Write (MB/s)
60/64GB	350	180
120/128GB	530	380
240/256GB	473	386
480/512GB	540	495
960GB/1TB	550	510
1920GB/2TB	550	510

**NOTES:**

1. The performance was measured using CrystalDiskMark v5.0x64 with SATA 6Gbps host.
2. Performance may differ according to flash configuration and platform.

### 2.2. Power

**Table 2-2 Supply Voltage of INSPIRE LIT 2.5" SSD**

Parameter	Rating
Operating Voltage	5V +/-5%

**Table 2-3 Power Consumption of INSPIRE LIT 2.5" SSD**

Parameter	Power Consumption
Idle (Max.)	0.60
Active (Max.)	4.33

**NOTE:**

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

## 2.3. TBW (Terabytes Written)

Capacity	TBW
64GB	85
128GB	175
256GB	364
512GB	730
1TB	1493
2TB	3022

### 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 INSPIRE LIT 2.5" is more than 2 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 Extended Grade: -45°C ~ 95°C
Storage Humidity	Silver Grade: 40°C, 95% RH Diamond Grade: 55°C, 95% RH Extended Grade: 55°C, 95% RH
Operating Humidity	Silver Grade: 40°C, 93% RH Diamond Grade: 55°C, 95% RH Extended 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
Bending	≥ 20N, Hold 1 min/5 times
ESD	24°C, 49% RH, +/-4KV

## 4. ATA COMMANDS



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 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
<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



## 5. PIN ASSIGNMENT

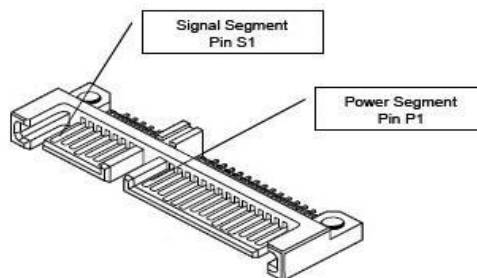


Figure 5-1 Pin Assignment of INSPIRE LIT 2.5” SSD

Table 5-1 Signal Segment Pin Assignment and Description

Pin Number	Function
S1	GND
S2	RX+ (Differential Signal Pair A)
S3	RX- (Differential Signal Pair A)
S4	GND
S5	TX- (Differential Signal Pair B)
S6	TX+ (Differential Signal Pair B)
S7	GND

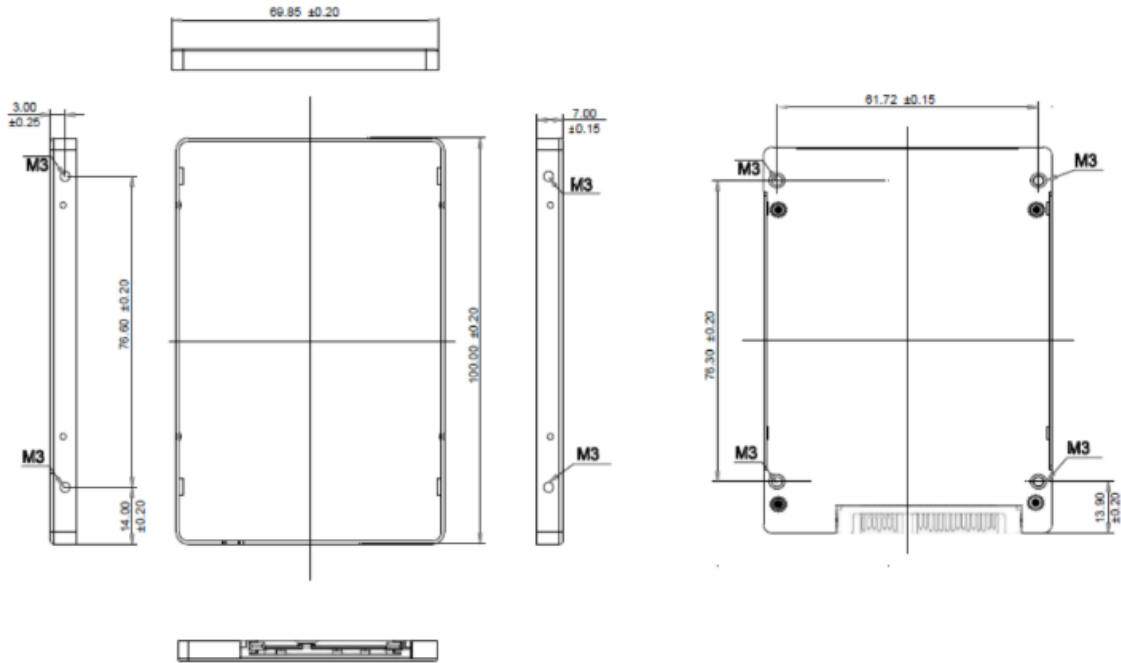
Table 5-2 Power Segment Pin Assignment and Descriptions

Pin Number	Function
P1	NC
P2	NC
P3	DEVSLP
P4	GND
P5	GND
P6	GND
P7	5V
P8	5V
P9	5V
P10	GND
P11	DAS/DSS
P12	GND
P13	NC
P14	NC
P15	NC

## 6. PHYSICAL DIMENSION



Dimension: 100mm(L) x 69.85mm(W) x 7mm(H)



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## 7. ORDERING INFORMATION



Capacity	MPN (Extended Grade)	MPN (Diamond Grade)	MPN (Silver Grade)
64GB	FSSB064GBD-M900	FSSB064GBE-M900	FSSB064GBS-M900
60GB	FSSB060GBD-M900	FSSB060GBE-M900	FSSB060GBS-M900
128GB	FSSB128GBD-M900	FSSB128GBE-M900	FSSB128GBS-M900
120GB	FSSB120GBD-M900	FSSB120GBE-M900	FSSB120GBS-M900
256GB	FSSB256GBD-M900	FSSB256GBE-M900	FSSB256GBS-M900
240GB	FSSB240GBD-M900	FSSB240GBE-M900	FSSB240GBS-M900
512GB	FSSB512GBD-M900	FSSB512GBE-M900	FSSB512GBS-M900
480GB	FSSB480GBD-M900	FSSB480GBE-M900	FSSB480GBS-M900
1TB	FSSB001TBD-M900	FSSB001TBE-M900	FSSB001TBS-M900
960GB	FSSB960GBD-M900	FSSB960GBE-M900	FSSB960GBS-M900
2TB	FSSB002TBD-M900	FSSB002TBE-M900	FSSB002TBS-M900*
1920GB	FSSB1920BD-M900	FSSB1920BE-M900	FSSB1920BS-M900*

### AES256, TCG OPAL

Capacity	MPN (Extended Grade)	MPN (Diamond Grade)	MPN (Silver Grade)
64GB	FSSB064GBD-M90S	FSSB064GBE-M90S	FSSB064GBS-M90S
60GB	FSSB060GBD-M90S	FSSB060GBE-M90S	FSSB060GBS-M90S
128GB	FSSB128GBD-M90S	FSSB128GBE-M90S	FSSB128GBS-M90S
120GB	FSSB120GBD-M90S	FSSB120GBE-M90S	FSSB120GBS-M90S
256GB	FSSB256GBD-M90S	FSSB256GBE-M90S	FSSB256GBS-M90S
240GB	FSSB240GBD-M90S	FSSB240GBE-M90S	FSSB240GBS-M90S
512GB	FSSB512GBD-M90S	FSSB512GBE-M90S	FSSB512GBS-M90S
480GB	FSSB480GBD-M90S	FSSB480GBE-M90S	FSSB480GBS-M90S
1TB	FSSB001TBD-M90S	FSSB001TBE-M90S	FSSB001TBS-M90S
960GB	FSSB960GBD-M90S	FSSB960GBE-M90S	FSSB960GBS-M90S
2TB	FSSB002TBD-M90S	FSSB002TBE-M90S	FSSB002TBS-M90S*
1920GB	FSSB1920BD-M90S	FSSB1920BE-M90S	FSSB1920BS-M90S*

\* Please check with FLEXXON

## Revision History

Revision	Draft Date	History
1.0	2019/10	Preliminary release
1.1a	2020/05	Update temperature
1.1b	2021/02	Update product overview and ordering information

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