

Zheino

M. 2 NGFF SSD

Datasheet

CHN-NGFFSAXXXX-XXX

M.2 NGFF Solid State Drive

Datasheet

Notes:

The contents of this datasheet and the product specifications are subject to change without notice!

Revision History

Revision	Date	Description
1.0	Jun, 2019	Release

ZHELIANG

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1. Overview

1.1 Key Features

- Fully compatible with SATA III 6.0 Gb/s and 3.0Gb/s and 1.5Gb/s standard
- Built-in ECC (Error Correction Code) functionality
- Enhanced endurance by dynamic/static wear-leveling^①
- Support dynamic power management
- Enhanced power-loss data protection
- Data integrity under power-cycling
- Support S.M.A.R.T.
- Bad-block management^②
- Support Trim and NCQ (Native Command Queuing) command
- Support BCH ECC 40bits in 1024 bytes- Intelligent destruction function.

Notes:

- ① The controller supports static/dynamic wear leveling. When the host writes data, the controller will find and use the block with the lowest erase count among the free blocks. This is known as dynamic wear leveling. When the free blocks' erase count is higher than the data blocks', it will activate the static wear leveling, replacing the not so frequently used user blocks with the high erase count free blocks.
- ② When the flash encounters ECC failed, program fail or erase fail, the controller will mark the block as bad block to prevent the used of this block and caused data lost later on.

2. Product Specifications

2.1 Capacity

Physical Capacity	Available Capacity ^①	LBA
64GB	59.0GB	123731968
128GB	118.0GB	247463936
256GB	236.0GB	494927872
512GB	472.0GB	989855744

Notes:

- ① 1 GB = 1,000,000,000 bytes; 1 sector = 512 bytes.

The total available capacity of the SSD may be less than the total physical capacity because a small portion of the capacity is used for NAND flash management and maintenance purposes.

- ② MLC flash=1TB(max); SLC flash=256GB (max);TLC flash=2TB(max)

2.2 Cache Size

Cache Size	No	128MB	256MB	512MB
SSD Capacity	●			

2.3 Physical Specification

Form Factor	2242&2260&2280
Connector	M.2 NGFF
Dimensions (mm)	2242: 42mmx22mmx3.7mm 2260: 60mmx22mmx3.7mm 2280: 80mmx22mmx3.7mm
Weight	≈50g
Input Voltage	3.3V±5%

2.4 Environmental Specification

Operating Temperature	Commercial Grade (0°C~+70°C) Industrial Grade (-40°C~+85°C)	
Storage Temperature	-55°C to 95°C	
Humidity	Operating	95% (Non-condensing)
	Non-Operating	95% (Non-condensing)

Note: ① Refer to MIL-STD-810F method 514.5 procedure I. ② Refer to MIL-STD-810F method 516.5 procedure I.

2.5 Performance

Capacity	Flash type	Sequential Read ^② (MB/S)	Sequential Write ^② (MB/S)	IOPS Random Read (4K QD32) ^③	IOPS Random Write (4K QD32) ^③
64GB	TLC	500	400	45673	41015
128GB	TLC	520	410	52443	50819
256GB	TLC	550	430	75264	68352
512GB	TLC	550	450	76236	69467

Note:

- ① Test platform: ASUS Z97-A, CPU i5-4590, DDR III 4GB, Windows® 7 32bit with AHCI mode.
Flash mode: Asynchronous.
- ② Tested base on Crystal Disk Mark (Version 3.0.1), default test data(Random), copied file 1000MB, unit MB/s.
- ③ Tested base on Iometer 2008, unit IOPs.
- ④ "—" in the table means it is nonexistent.

2.6 Power Consumption

Input voltage	3.3 V		
Capacity	Read(watt)	Write(watt)	Idle(watt)
64GB	1.15	1.2	0.32
128GB	1.30	1.6	0.40
256GB	1.75	2.55	0.45
512GB	1.75	2.56	0.45

Notes: The value is obtained while IOMeter running 1M sequential reads/writes and idle mode, unit watt.

Flash type: Triple-Level Cell (TLC).

2.7 Reliability

Data Retention	10 years	
MTBF	2,000,000 hours	
Write Endurance	Capacity	TLC
	64GB	80TB
	128GB	160TB
	256GB	320TB
	512GB	640TB

Notes: Endurance=Capacity*P/E cycle/WAI

2.8 Temperature Sensor

Temperature sensor	Yes	No
	●	

2.9 Product Ecological Compliance

RoHS	Reach	EuP
●		

2.10 Certifications

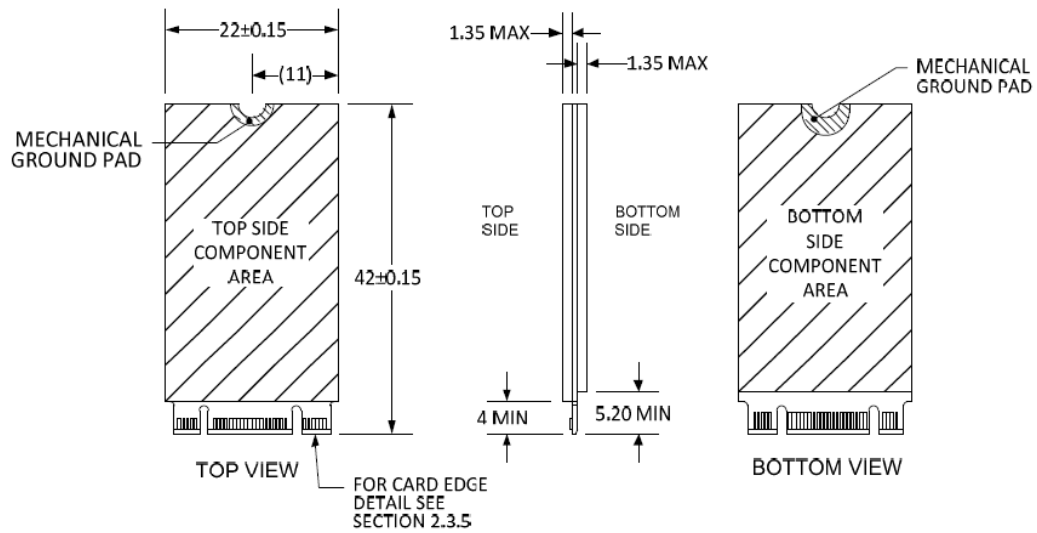
CE	FCC	UL
●	●	●

3. Mechanical Information

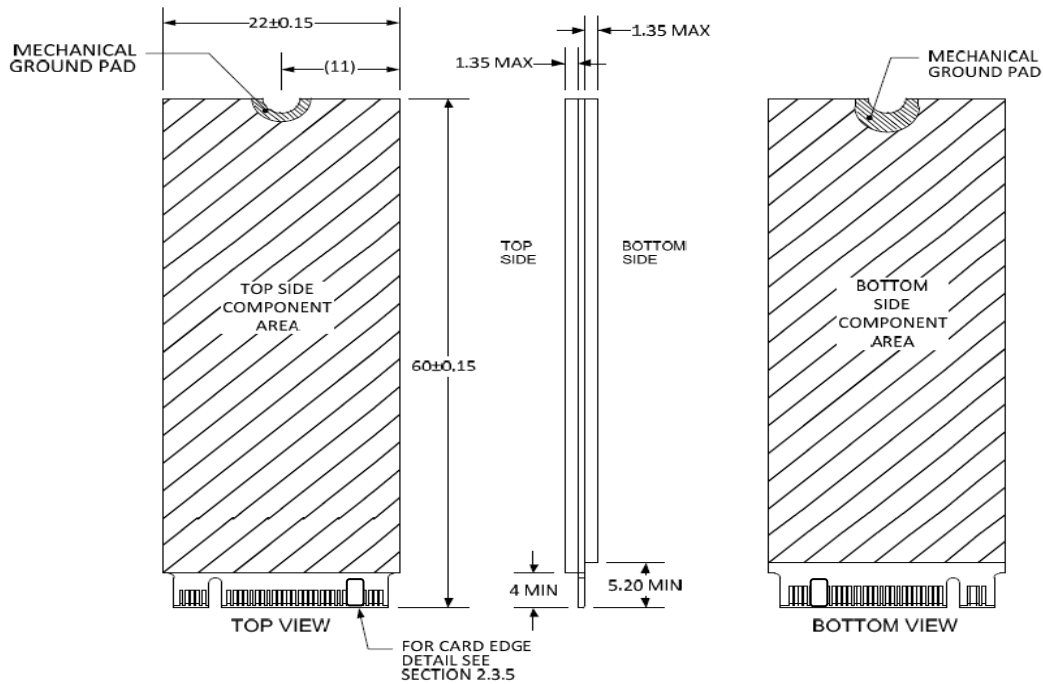
3.1 Dimensions

Unit: mm

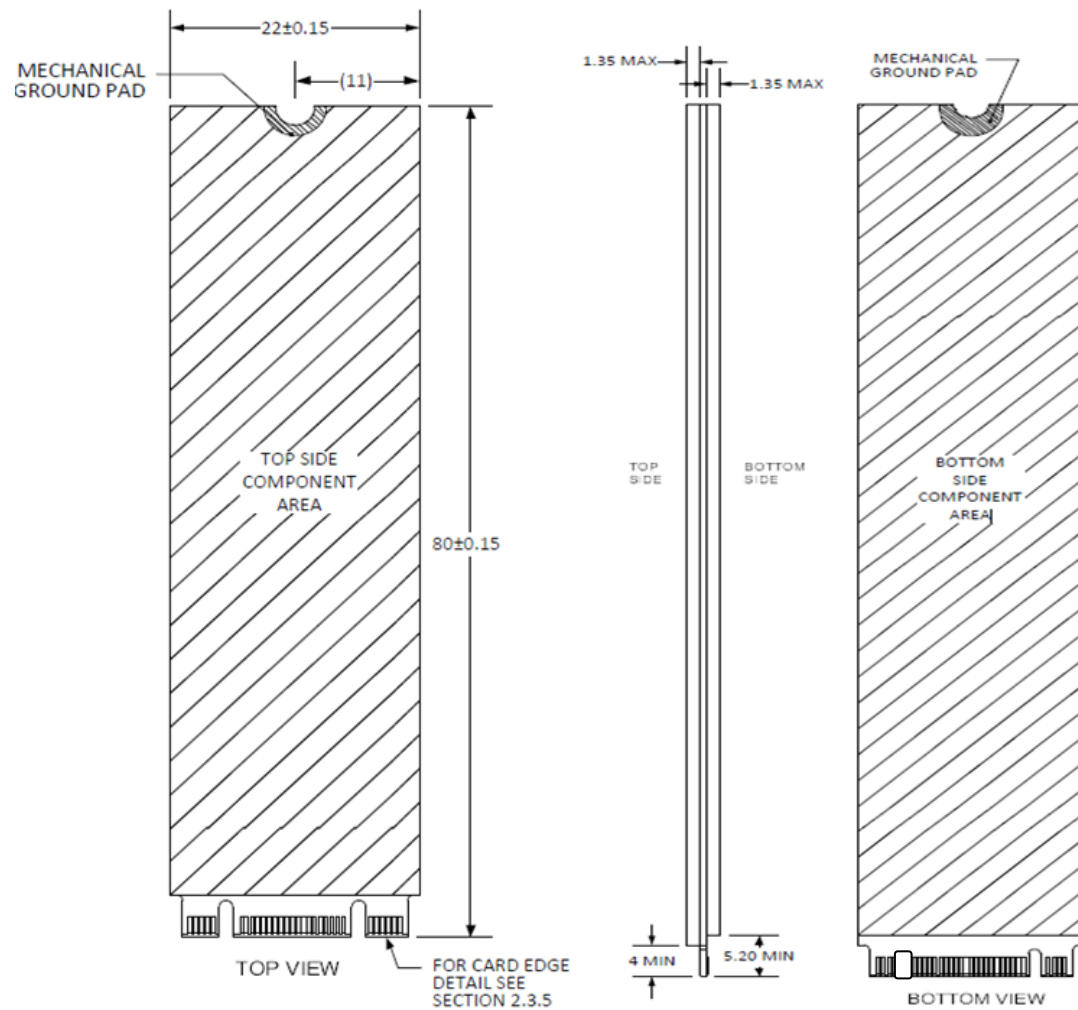
2242:



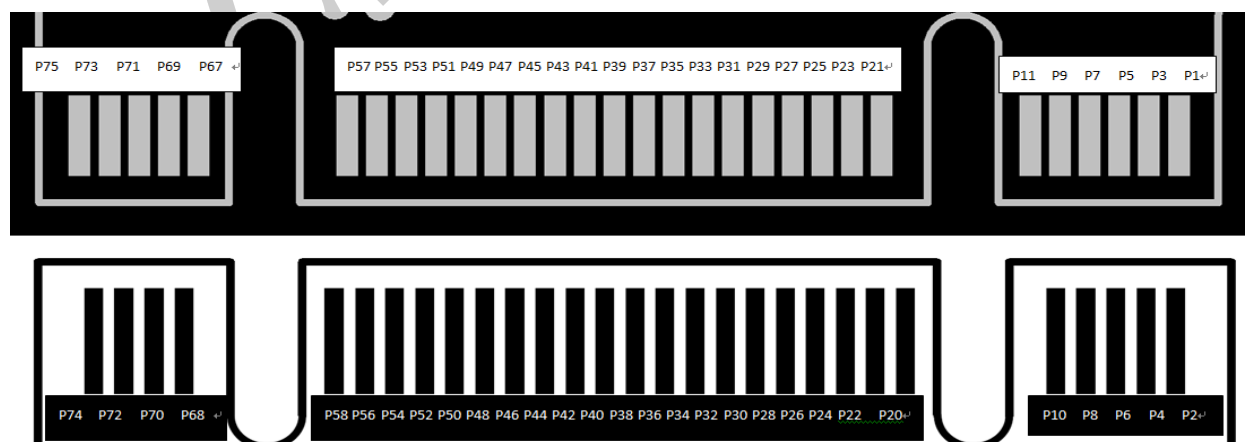
2260:



2280:



3.2 Pin Locations



3.3 Signal Descriptions

PIN	Definition	Description	PIN	Definition	Description
1	CONFIG_3= GND	Config Ground	2	3.3V	3.3V Power
3	GND	Ground	4	3.3V	3.3V Power
5	NC	Not Connect	6	NC	Not Connect
7	NC	Not Connect	8	NC	Not Connect
9	NC	Not Connect	10	DAS/DSS# (O)(OD)	Device Activity
11	NC	Not Connect	12	KEY	Key pin
13	KEY	Key pin	14	KEY	Key pin
15	KEY	Key pin	16	KEY	Key pin
17	KEY	Key pin	18	KEY	Key pin
19	KEY	Key pin	20	NC	Not Connect
21	CONFIG_0= GND	Config Ground	22	NC	Not Connect
23	NC	Not Connect	24	NC	Not Connect
25	NC	Not Connect	26	NC	Not Connect
27	GND	Ground	28	NC	Not Connect
29	NC	Not Connect	30	NC	Not Connect
31	NC	Not Connect	32	NC	Not Connect
33	GND	Ground	34	NC	Not Connect
35	NC	Not Connect	36	NC	Not Connect
37	NC	Not Connect	38	DEVSLP (I)(0/3.3V)	Devslp
39	GND	Ground	40	NC	Not Connect
41	SATA-B+	Receive Differential Signal pair	42	NC	Not Connect
43	SATA-B-	Receive Differential Signal pair	44	NC	Not Connect
45	GND	Ground	46	NC	Not Connect
47	SATA-A-	Receive Differential Signal pair	48	NC	Not Connect

49	SATA-A+	Receive Differential Signal pair	50	NC	Not Connect
51	GND	Ground	52	NC	Not Connect
53	NC	Not Connect	54	NC	Not Connect
55	NC	Not Connect	56	Reserved for MFG Data	MFG
57	GND	Ground	58	Reserved for MFG Clock	MFG
59	KEY	Key pin	60	KEY	Key pin
61	KEY	Key pin	62	KEY	Key pin
63	KEY	Key pin	64	KEY	Key pin
65	KEY	Key pin	66	KEY	Key pin
67	NC	Not Connect	68	SUSCLK(32kHz) (I)(0/3.3V)	SUSCLK
69	CONFIG_1=GND	Config Ground	70	3.3V	3.3V Power
71	GND	Ground	72	3.3V	3.3V Power
73	GND	Ground	74	3.3V	3.3V Power
75	CONFIG_2=GND	Config Ground	\	\	\

4. Supported Command Sets

4.1 ATA Command Set

No.	Command	Code	Protocol
General Feature Set			
1	Execute Drive Diagnostic	90h	Device diagnostic
2	Flush Cache	E7h	Non-data
3	Identify Device	ECh	PIO data-in
4	Read DMA	C8h	DMA
5	Read Multiple	C4h	PIO data-in
6	Read Sector(s)	20h	PIO data-in
7	Read Verify Sector(s)	40h or 41h	Non-data
8	Set Feature	EFh	Non-data
9	Set Multiple Mode	C6h	Non-data
10	Write DMA	CAh	DMA
11	Write Multiple	C5h	PIO data-out
12	Write Sector(s)	30h	PIO data-out
13	NOP	00h	Non-data
14	Read Buffer	E4h	PIO data-in

15	Write Buffer	E8h	PIO data-out
Power Management Feature Set			
16	Check Power Mode	E5h or 98h	Non-data
17	Idle	E3h or 97h	Non-data
18	Idle Immediate	E1h or 95h	Non-data
19	Sleep	E6h or 99h	Non-data
20	Standby	E2h or 96h	Non-data
21	Standby Immediate	E0h or 94h	Non-data
Security Mode Feature Set			
22	Security Set Password	F1h	PIO data-out
23	Security Unlock	F2h	PIO data-out
24	Security Erase Prepare	F3h	Non-data
25	Security Erase Unit	F4h	PIO data-out
26	Security Freeze Lock	F5h	Non-data
27	Security Disable Password	F6h	PIO data-out
SMART Feature Set			
28	SMART Disable Operations	B0h	Non-data
29	SMART Enable/Disable Autosave	B0h	Non-data
30	SMART Enable Operations	B0h	Non-data
31	SMART Return Status	B0h	Non-data
32	SMART Execute Off-Line	B0h	Non-data
33	SMART Read Data	B0h	PIO data-in
Host Protected Area Feature Set			
34	Read Native Max Address	F8h	Non-data
35	Set Max Address	F9h	Non-data
36	Set Max Set Password	F9h	PIO data-out
37	Set Max Lock	F9h	Non-data
38	Set Max Freeze Lock	F9h	Non-data
39	Set Max Unlock	F9h	PIO data-out
48-bit Address Feature Set			
40	Flush Cache Ext	EAh	Non-data
41	Read Sector(s) Ext	24h	PIO data-in
42	Read DMA Ext	25h	DMA
43	Read Multiple Ext	29h	PIO data-in
44	Read Native Max Address Ext	27h	Non-data
45	Read Verify Sector(s) Ext	42h	Non-data
46	Set Max Address Ext	37h	Non-data
47	Write DMA Ext	35h	DMA
48	Write DMA FUA Ext	3Dh	DMA
49	Write Multiple Ext	39h	PIO data-out
50	Write Multiple FUA Ext	CEh	PIO data-out

51	Write Sector(s) Ext	34h	PIO data-out
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4.2 S.M.A.R.T. Attributes

ID	Attribute Name	ID	Attribute Name
0x01	Read Error Rate	0xB1	WearLeveling Count
0x05	Reallocated Sectors Count	0xB2	Used Reserved Block Count
0x09	Power On Hours	0xB5	Program Fail Count
0x0C	Power Cycle Count	0xC0	Power off Retract Count
0xA0	Uncorrectable Sector Count On Line	0xC2	Temperature
0xA1	Number of Pure Spare	0xC3	Hardware ECC recovered
0xA3	Number of Initial Invlid Block	0xB6	Erase Fail Count
0xA4	Total Erase Count	0xC4	Reallocation Event Count
0xA5	Max Erase Count	0xC5	Current pending sector count:
0xA6	Min Erase Count	0xC6	Uncorrectable Sector Count OffLine
0xA7	Average Erase Count	0xC7	UDMA CRC Error
0xA8	Max Erase Count in Spec	0xE8	Available Reserved Space
0xA9	Remain Life Percentage	0xF1	Write Sector Count
0xAF	Worst Die Program Fail Count	0xF2	Read Sector Count
0xB0	Worst Die Erase Fail Count	0xF5	Flash Write count

5. Model Name Rules

CHN-XXXXXX-XXX

1 2 3-45678-91011

1~3: CHN: Zheino standard products

4~8: Product size code

2.5SATA: 2.5Inch SATA H:7mm

mSATA:MSATA

NGFFSA2242:M.2 2242

NGFFSA2280:M.2 2280

NGFFSA2260:M.2 2260

9~11: Product capacity code

064: 64GB

128: 128GB

256: 256GB

512: 512GB

1TB: 1TB

2TB:2TB

6. Product Source

Design and Manufacture in CHN Technology.

7. Contact Information

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