FORESEE eMMC

Test Report

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Product Information

Brand : FORESEE

Model : NCEMASLD-32G

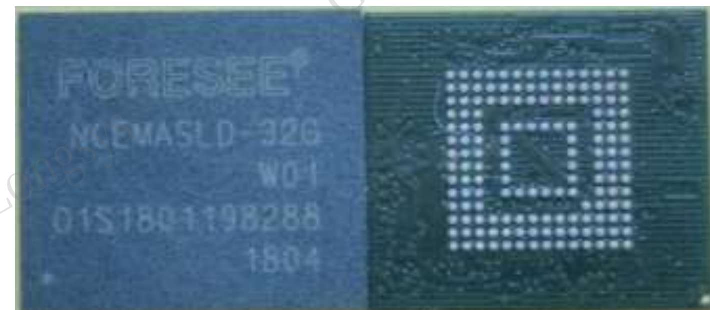
Partition Configuration :

Density	NAND Type	Boot partition 1	Boot partition 2	RPMB
32GB	256Gb	4,096KB	4,096KB	4,096KB

Capacity : 29600 MByte

Dimensions : 11.5*13*1.0mm

JEDEC Standard : v5.1



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Test Summary

Test Result:	■ Pass	☐ Fail	☐ Conditional Pass

Test Items		Test Results		Note
1	Performance	■Pass	☐Fail	
2	Electrical Performance	■Pass	☐Fail	
3	Power Cycle	■Pass	☐Fail	
4	Burn-In	■Pass	☐Fail	
5	Wear Leveling	■Pass	☐Fail	
6	Reliability	■Pass	☐Fail	
7	Compatibility	■Pass	☐Fail	

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1. Performance

PC+Card Reader :

Num	Tool	File	Read	Write	Note
1.1	Crystal Disk Mark	1000MB	198.3MB/S	128.9 MB/S	IDA
			158.2 MB/S	26.9 MB/S	
1.2	H2test	Full Capacity	126 MB/S	23.8 MB/S	
1.3	IOmeter	100 MB	3023.12 IOPS(4K)	2770.00 IOPS(4K)	
		1000MB	3368.78 IOPS(4K)	2108.83 IOPS(4K)	
1.4	HD_Tune	Full Capacity	172.4 MB/S	59.5 MS/S	IDA

Test Conditions : GL3224 Card Reader, USB3.0, FAT32 File System, Intel i5 3.5GHz, 8GB DDR3 @25℃

Android OS :

Num	Tool	SOC	Read	Write	Note
1.5	Androbench.apk	MTK P25	233.47 MB/S	109.5 MB/S	Sequential Data
			4485. 52 IOPS(4K)	2070.58 IOPS(4K)	Random Data

Test Conditions : MTK P25, 1GB DDR3, Android 7.0, @25℃

1. Performance

Crystal Disk Mark:

IDA (1, 1GiB, D: 0% (0/29GiB))

All	Read [MB/s]	Write [MB/s]
Seq Q32T1	198.3	128.9
4K Q32T1	14.87	9.196
Seq	215.4	128.6
4K	13.11	8.869

TLC (1, 1GiB, D: 0% (0/29GiB))

All	Read [MB/s]	Write [MB/s]
Seq Q32T1	158.2	26.90
4K Q32T1	13.08	8.947
Seq	161.9	23.07
4K	11.57	8.668

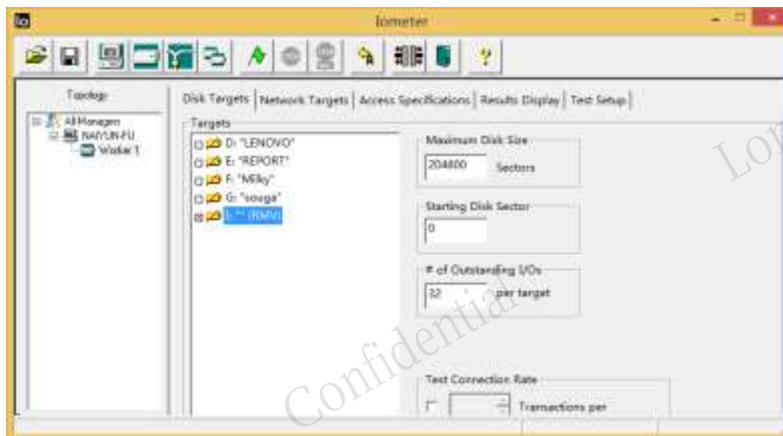
H2test:

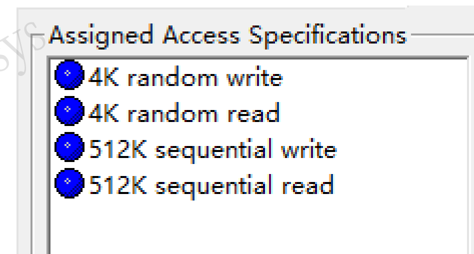
Writing	Verifying
29532 MByte	29532 MByte
20:38 min	3:54 min
23.8 MByte/s	126 MByte/s

Warning: Only 29532 of 29599 MByte tested.
Test finished without errors.
You can now delete the test files *.h2w or verify them again.
Writing speed: 23.8 MByte/s
Reading speed: 126 MByte/s
H2testw v1.4

1. Performance

IOmeter IOPS		
Access Mode	**100 MB**	**1000MB**
4k random write IOPS	2770.00	2108.83
4k random read IOPS	3023.12	3368.78
512k sequential write IOPS	95.61	47.78
512k sequential read IOPS	380.48	317.62

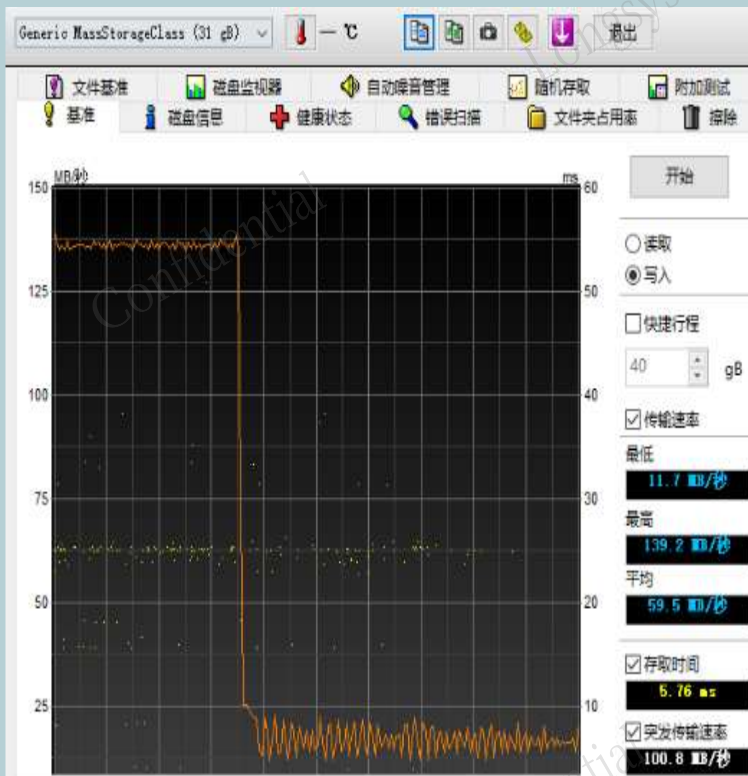




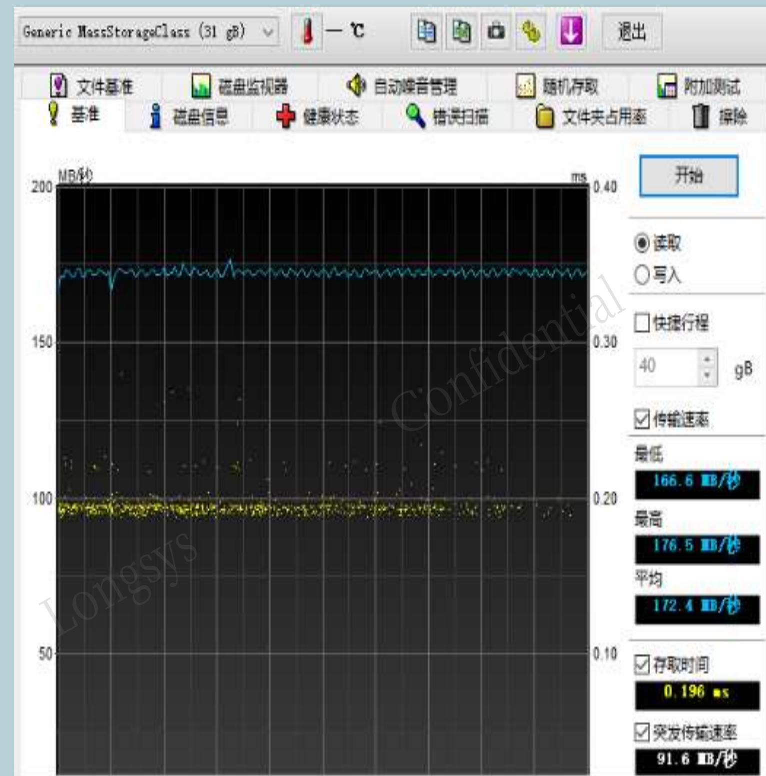
1. Performance

HD_Tune

Write :



Read :



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2. Electrical Performance

Test Results

I/O Voltage	Maximum Instantaneous Current	Standby Current	Write	Read	Standby Current after Read and Write
SPEC Standard	<100	<150	<200	<200	<150
3.3V I/O	44.831mA	34μA	9.229~44.831mA Avg:42.131mA	15.404~39.483mA Avg:38.626mA	32μA
1.8V I/O	69.57mA	83μA	31.502~46.224mA Avg:45.067mA	41.59~69.57mA Avg:68.90mA	85μA

Test Conditions : GL3224 Card Reader, USB3.0, FAT32 File System, Intel i5 3.5GHz, 8GB DDR3 @25℃, Fluke289C

3. Power Cycle

Num	Item	Details	Sample	Result
3.1	File System Stability	Power off randomly when writing data to the device. Cycle test.	6	≥ 5000cycle
3.2	Fixed Address Stability	Power off randomly when writing data to the fixed address. Cycle test.	6	≥ 5000cycle
3.3	Random Address Stability	Power off randomly when writing data to random address. Cycle test.	6	≥ 5000cycle
3.4	New/Old Data Stability	Power off randomly when new data is written on the basis of old data on random address. Cycle test.	4	≥ 5000cycle
3.5	Idle Stability	Power off randomly when the device is idle. Cycle test.	4	≥ 5000cycle

Test Conditions : GL3224 Card Reader, USB3.0, FAT32 File System, Intel i5 3.5GHz, 8GB DDR3 @25℃

3. Power Cycle

Num	Item	Details	Sample	Result
3.6	Reboot	Hot boot. Cycle test.	10	≥ 5000cycle
3.7	Boot Stability	Power off randomly when the device is booting. Cycle test.	10	≥ 1000cycle
3.8	Read/Write Stability	Power off randomly when the device is reading or writing data. Cycle test.	10	≥ 1000cycle
3.9	Cold Boot	Cold boot. Cycle test.	10	≥ 2000cycle

Test Conditions : Android OS / YunOS @25℃

4. Burn-In

Num	Item	Details	Sample	Result
4.1	Room Temperature Burn-in	Room temperature @ 25℃ burn-in 300cycle	20	≥ 300cycle
4.2	High Temperature Burn-in	High temperature @ 70℃ burn-in 300cycle	8	≥ 300cycle
4.3	Low Temperature Burn-in	Low temperature @ -25℃ burn-in 300cycle	8	≥ 300cycle
4.4	Thermal Cycling Burn-in	Thermal Cycling@ -25℃~70℃ burn-in 300cycle	6	≥ 300cycle

Test Conditions : GL3224 Card Reader, USB3.0, FAT32 File System, Intel i5 3.5GHz, 8GB DDR3, Burn in test V6.0 (file size 1%)

4. Burn-In

Num	Item	Details	Sample	Result
4.5	Low Voltage Burn-in	VCC、VCCQ low voltage read/write burn-in.	4	≥ 72 hours
4.6	Random Read/Write Burn-in	Random read/write on random address burn-in.	4	≥ 72 hours
4.7	Multiple Read/Write Burn-in	Multiple read/write and burn-in test.	4	≥ 72 hours
4.8	Local Burn-in	Local data transfer burn-in.	4	≥ 72 hours
4.9	BOOT / RPMB Random Read/Write	BOOT / RPMB area random read/write, cycling burn-in.	4	≥ 72 hours
4.10	Read-only Burn-in	Read-only cycling burn-in.	4	≥ 72 hours
4.11	Write Burn-in	Write in the fixed address cycling burn-in.	4	≥ 72 hours

Test Conditions : GL3224 Card Reader, USB3.0, FAT32 File System, Intel i5 3.5GHz, 8GB DDR3 @25℃

4. Burn-In

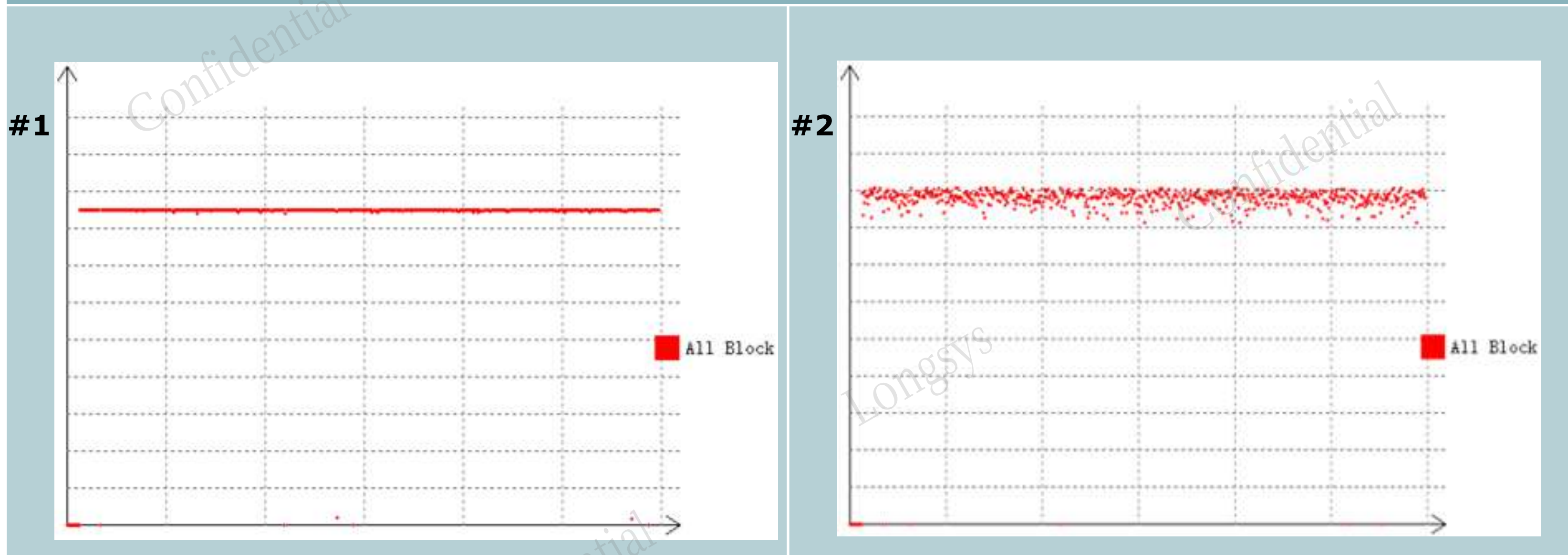
Num	Item	Details	Sample	Result
4.12	Read/Write Burn-in	Read/Write burn-in, verify data in a cycling pattern.	10	≥ 72 hours
4.13	Video Playback	Play1080P Full-HD video file in a cycling pattern.	10	≥ 72 hours
4.14	Low Voltage Burn-in	Low battery read/write burn-in.	5	≥ 72 hours

Test Conditions : Android OS / YunOS @25℃

5. Wear Leveling

Num	Item	Details	Result
5.1	FA	Check P/E cycle of all blocks.	Pass

Figure:



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6. Reliability

Num	Item	Sample	Details	Result
6.1	Precondition level III	154	Temperature：30℃/Humidity：60% RH/ Time：192 hrs	Pass
6.2	Temperature and moisture operation test	22	Temperature：60℃/Humidity：85% RH/ Burn in 72 hrs	Pass
6.3	Low temperature operation	22	Temperature：-25° C / Burn in 72 hrs	Pass
6.4	High temperature storage test	22	Temperature：70° C /Time：72hrs	Pass
6.5	Low temperature storage test	22	Temperature：-40° C / Time：168hrs	Pass
6.6	Temperature cycle storage test	22	Condition: -40° C~85° C, 500cycles	Pass
6.7	UHAST	22	130C, 85%RH, 96hrs, JESD22-A118	Pass

6. Reliability

Num	Item	Sample	Details	Result
6.8	ESD test	6	Contact discharge to pads : HBM test: +/- 2KV according to JESD 22-A114-D 100pf/1.5k ohms MM test: +/- 200V reference JESD 22-A-115-A 200pf / 0 ohm	Pass
6.9	solderability test	5	Use the samples from C2 latch-up test , JESD22-B102	Pass
6.10	solder ball shear	5	30balls/package,JESD22-B117	Pass

7. Endurance

Num	Item	Sample	Precondition	Details	Result
7.1	Program/Erase Endurance	100	1000 W/E cycle	Internal Test Tool Ta=25° C, Vcc=3.3V	**Pass**
7.2	Data Retention	50	Fresh or Early Life Device (Written cycles less than 1% of the maximum endurance specification)	Retention Use (power off) Ta=85° C, (Test time equivalent to 5 years @25° C)	**Pass**
		50	Cycle Device (Written cycles equal maximum endurance specification)	Retention Use (power off) Ta=85° C, (Test time equivalent to 1 years @25° C)	**Pass**

8. Compatibility

Num	SOC vendor	SOC	Result
8.1	MTK	MTK8127/MTK8735/MTK8321/MTK8163/ MTK P25	Pass
8.2	Intel	Apollo lake/Cherrytrail T3	Pass
8.3	Rockchip	RK3229/RK3288/RK3328/RK3126	Pass
8.4	Allwinner	A33/A64/H6	Pass
8.5	Spreadtrum	SC9830A	Pass

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Thank you

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