Product Specification of Huizhou Everest Lithium Energy Co.

File No.: LF50K-73103 Edition

Version: E

Effective date: 2021-12-02

Product Name:	Square Aluminum Lithium Iron Phosphate Battery
Product Model:	LF50K
Product Specifications:	3.2V/50Ah
Drafted by. Make:	
Review. Audit:	
Approval Approved:	
Customer Confirmation:	

Mailbox:sales@evebattery.com

Address: No. 68, Jingnan Avenue, Duodao District, Jingmen High-tech Zone, Hubei Province, China

Record of specification revisions

dates	element	releases
2018-06-28	new issue	A
2018-09-10	Cover plate threaded hole from M6 to M4	B
2019-03-23	Revised and new technical requirements	C
2019-12-02	Revised and new technical requirements	D
2021-12-02	Additional technical requirements	E

catalogs

1 Scope of application

This standard describes the product type, basic performance, test methods and precautions for square aluminum shell lithium iron phosphate batteries produced by Huizhou Yiwei Lithium Energy Co. This product is applicable to vehicle power system and energy storage system, etc..

2 Product Type

2.1 Product Name：Square Aluminum Lithium Iron Phosphate Battery

2.2 Model specification: LF50K

3 Nominal technical parameters

serial number	sports event		parameters	note
1	nominal capacity		50Ah	(25±2)°C, standard charge and discharge.
2	nominal voltage		3.2V	
3	Internal resistance (1KHz)		≤0.7mΩ	
4	Standard Charge and Discharge	Charge/discharge current	0.5C/0.5C	(25±2)°C
		Charge/discharge cutoff voltage	3.65V/2.5V	
5	Maximum charge/discharge current	Continuous charging/discharging	3C/3C	Reference to Appendix VI
		Pulse charge/discharge (30s)	5C/5C	
6	Recommended SOC Usage Window		10%～ 90%	N.A.
7	Charging operating temperature		0°C～ 55°C	Reference to Appendix VI
8	Discharge operating temperature		-20°C～ 55°C	
9	Storage temperature	Short-term (within 1)	-20°C～ 45°C	N.A.
		Long-term (within 1)	0°C～ 35°C	
10	Storage humidity		＜95%	
11	Monthly self-discharge rate		≤3%/month	(25±2)°C, 30%～ 50% SOC storage

serial number	sports event		parameters	note
12	sizes	height	135.3±0.5mm	Reference to Appendix I
13		thicknesses (30%-40% SOC)	29.3±0.7mm	
14		Height (total)	185.3±0.5mm	
15		Height (body height)	180.8±0.5mm	
16		Pole center distance	67.5±1.0mm	
17	Battery weight		1395±50g	

4 test condition

4.1 Test environment condition

temperature: (25±2)°C

Relative humidity: 15%～ 90%

Atmospheric pressure: 86KPa～ 106KPa

4.2 standard charge

At (25±2)°C, the battery was charged at a constant current of 0.5C(A) to a charge limiting voltage of 3.65V and then at a constant voltage until the current was less than 0.05C(A).

4.3 standard discharge

The battery was discharged at a constant current of 0.5C(A) to a termination voltage of 2.5V at (25±2)°C.

5 Battery Performance

5.1 electrical property

serial number	sports event	technical requirement	Test Methods
1	25°C multiplier discharge performance	Discharge capacity/nominal capacity×100% A) 0.5C(A) ≥100% B) 1.0C(A) ≥100% C) 3.0C(A) ≥97%	After standard charging of the battery, the battery was set aside for 1h, and the battery was 0.5C(A), 1.0C(A), 3.0C(A) Discharge to 2.5V, if the discharge capacity does not meet the technical requirements, this test is allowed to repeat 3 times.
2	Discharge performance at different temperatures	Discharge capacity/nominal capacity x 100% A) ≥95% at 55°C B) ≥80% at 0℃ C) ≥70% at -20°C	A) After standard charging of the battery, it was set aside for 5h at 55±2°C and discharged to 2.5V at 1.0C(A); B) After standard charging of the battery, it was set aside for 24h at 0±2°C and discharged to 2.0V at 1.0C(A); C) After standard charging of the battery, it was set aside for 24h at -20±2°C and discharged to 2.0V at 1.0C(A).
3	25°C charge retention and recovery capability	Remaining Capacity≥ Nominal Capacity x 95% Recovery Capacity≥ Nominal Capacity x 97%	After standard charging of the battery, leave it open circuit for 28 days; discharge it to 2.5V with 1.0C(A) and record it as the remaining capacity; after standard charging again, leave it aside for 30min and discharge it to 2.5V with 1.0C(A) and record it as the restored capacity.
4	Cycle life at 25°C	≥7000 times @1C/1C	(25±2)°C, with the battery in a 300kgf fixture: to 1.0C(A) constant-current, constant-voltage charge to 3.65V, cutoff current 0.05C(A), set aside for 30min, discharge to 2.5V at a constant current of 1.0C(A), set aside for 30min, and proceed to the next cycle until the capacity decays to 80% of the nominal capacity.
5	45°C cycle life	≥2500 times @1C/1C	(45±2)°C, with the battery in a 300kgf clamp: to 1.0C(A) constant-current, constant-voltage charge to 3.65V, cutoff current 0.05C(A), set aside for 30min, discharge to 2.5V at a constant current of 1.0C(A), set aside for 30min, and proceed to the next cycle until the capacity decays to 80% of the nominal capacity.

6	End-of-life management	Capacity/nominal capacity <70%	Stop using the battery when it exceeds the end-of-life regulations during use.

5.2 safety performance

serial number	sports event	technical requirement	Test Methods
1	overdischarge	No explosion, no fire, no liquid leakage	Reference: GB/T 31485-2015 Safety Requirements and Test Methods for Power Storage Batteries for Electric Vehicles
2	overcharge	No explosion, no fire	
3	shorts	No explosion, no fire	
4	fall	No explosion, no fire, no liquid leakage	
5	heater	No explosion, no fire	
6	squeezes	No explosion, no fire	
7	treat by acupuncture	No explosion, no fire	
8	seawater immersion	No explosion, no fire	
9	temperature cycling	No explosion, no fire, no liquid leakage	
10	depression (meteorology)	No explosion, no fire, no liquid leakage	

6 haulage

Batteries should be packed in boxes for transportation in the charged state (30%～ 50%SOC), and should be protected from severe vibration, shock or extrusion, sun and rain during transportation.

7 pre-harvest

Batteries should be stored (more than 1 month) in a clean, dry and ventilated room with an ambient temperature of 0℃～ 35℃. Charge and discharge the battery every 6 months to store the charge state (30%～ 50%SOC).

8 caveat

1. When charging and discharging the battery, it should be ensured that there are conditions for monitoring and protecting the battery voltage, current and temperature.

2, please keep the battery away from heat, fire and other heating and strong acid, strong alkali and other corrosive environment.

3.Do not short the battery or install it with incorrect polarity at any time.

4. Do not mix batteries of different models or manufacturers.

5, please do not borrow external force to make the battery fall, impact, puncture, do not disassemble the battery or change the external structure.

6、When the battery is not used for a long time, please keep the battery charge at 30%～ 50%SOC state, and avoid being in strong direct sunlight or high temperature and high humidity environment.

7. Rubber gloves and other protective equipment are required when operating the battery.

8、If the battery leaks, smokes or breaks, please stop using it immediately and contact our company to deal with it.

Appendix I: Battery 2D diagram

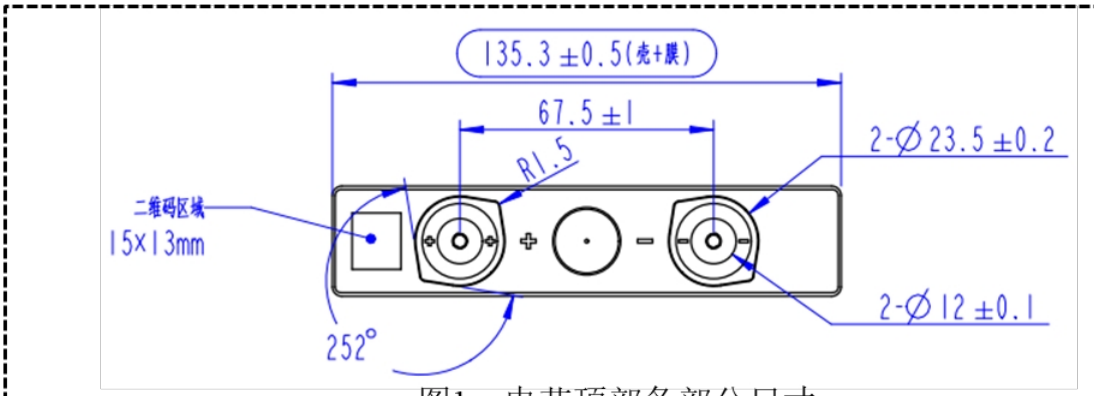


图1：电芯顶部各部分尺寸

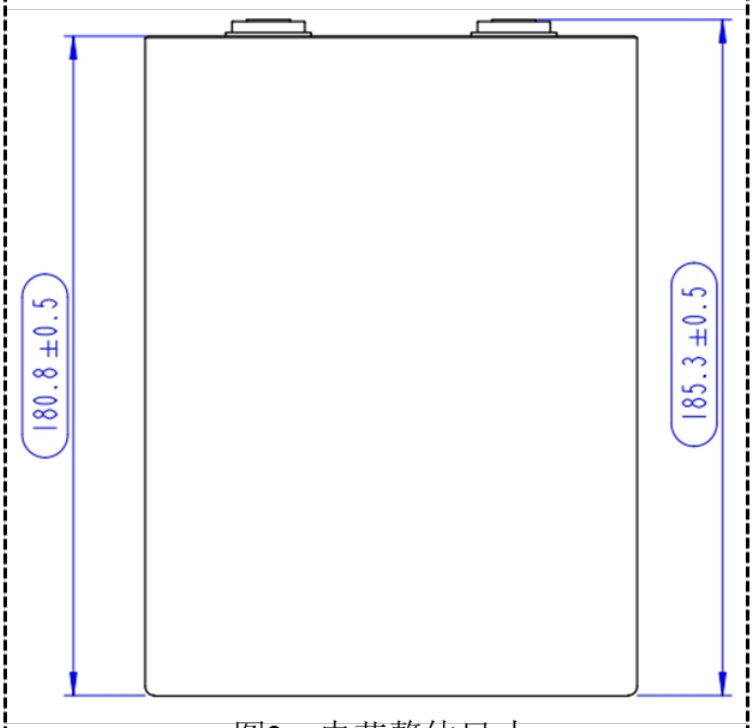


图2：电芯整体尺寸

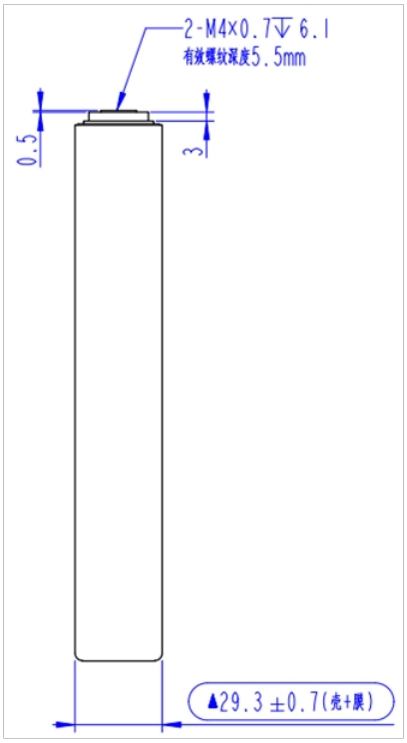
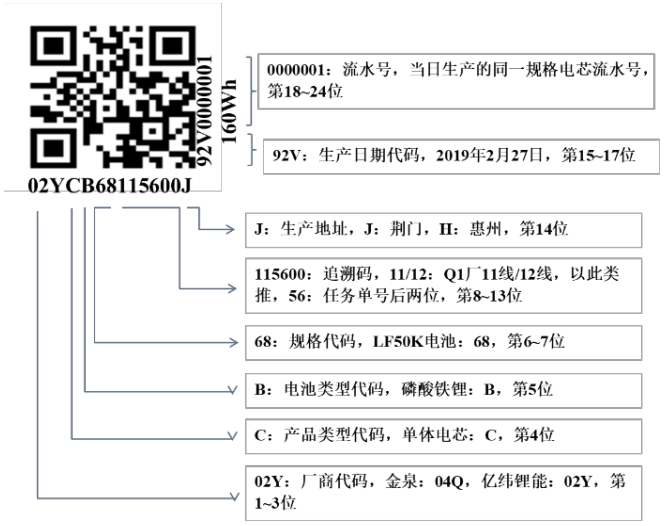
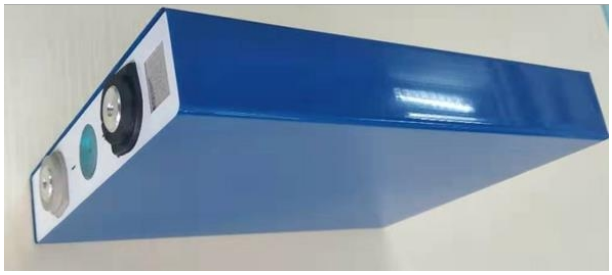


图3：极柱部分放大

Appendix II: Battery Engraving Rules



Appendix III: Photos of Battery Appearance



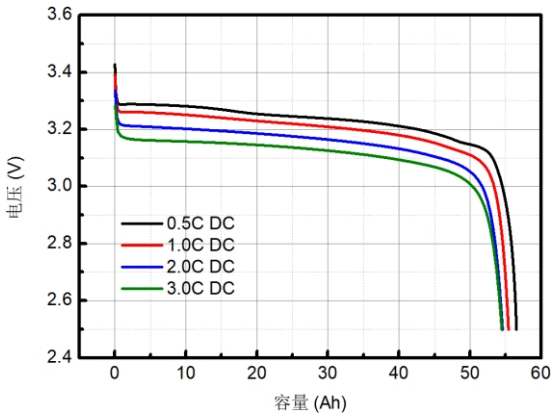
Appendix IV: Battery Packing Diagram

L*W*H : 355*342*240 mm

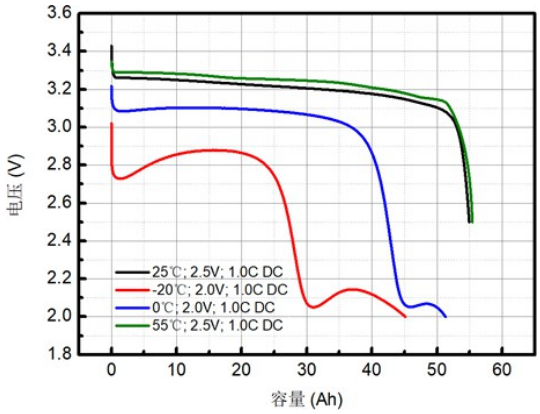
L*W*H : 1100*1100*1080 mm

Appendix V: Electrical Performance Graphs

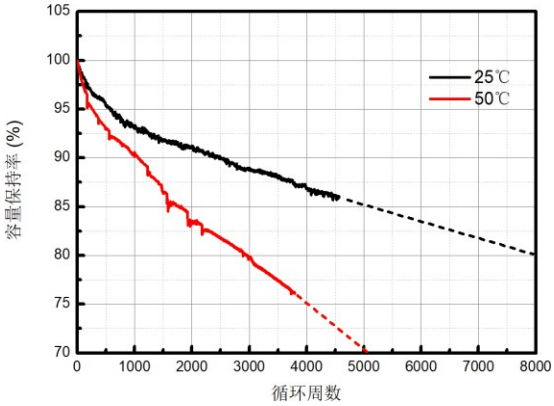
1、Discharge curve of 25℃ multiplication rate



2、Different temperature discharge curve



3. Cycle curve (1.0C charge/discharge 3.65V-2.5V)



Appendix VI: Charge and Discharge Characteristics Table

Table 1 Maximum Continuous Charge Multiplier MAP table for batteries at different temperatures and different SOCs

T(℃) / SOC (%)	0	5	10	15	20	25	30	35	40	45	50	55
0%~≤30%	0.1	0.3	0.5	1	1.5	3	3	3	2	2	1	0.5
＞30%~≤70%	0.05	0.2	0.3	0.5	1	2	2	2	1.5	1.5	1	0.5
＞70%~100%	0	0.1	0.2	0.3	0.5	1	1	1	0.5	0.5	0.5	0.3

Table 2 Maximum pulse (30s) charging multiplier MAP table for batteries at different temperatures and different SOCs

T(℃) / SOC (%)	0	5	10	15	20	25	30	35	40	45	50	55
0%~≤30%	0.3	0.5	0.7	1.5	3	5	5	5	3	3	1.5	1
＞30%~≤70%	0.2	0.3	0.5	0.7	1.5	3	3	3	2	2	1.5	1
＞70%~100%	0	0.2	0.3	0.5	0.7	1	1	1	1	1	0.5	0.5

Table 3 Maximum Continuous Discharge Multiplier MAP of Batteries at Different Temperatures and Different SOCs

T(℃) / SOC (%)	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55
＞0%~≤30%	0.5	0.5	0.5	0.5	0.7	1	1	1	1	1	1	1	1	1	1	0.5
＞30%~≤70%	1	1	1	1	1	1	1.5	1.5	1.5	2	2	2	1.5	1.5	1	0.5
＞70%~100%	1	1	1	1	1.5	1.5	2	2	3	3	3	3	3	2	1.5	0.5

Table 4 Maximum pulse (30s) discharge multiplier MAP table for batteries at different temperatures and different SOCs

T(℃) / SOC (%)	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55
＞0%~≤30%	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	0.5
＞30%~≤70%	1	1	1	1	1.5	1.5	2	2	2	3	3	3	2	2	1	1
＞70%~100%	1.5	1.5	1.5	1.5	2	2	3	3	4	5	5	5	4	3	2	1