

## **3.2V 4000 MAH LFP KINERTIC POWER SOLAR GRADE**



### 1 Definition

#### Rated capacity

25±2°C 0.5C 2.0V Cap (mAh) Under 25±2°C, It means the capacity value of discharging to end voltage 2.0V with constant current of 0.5C, which is signed Cap, the unit is mAh.

#### Standard charge method

25±2°C 0.5C 3.65V 3.65V 0.05C

Under 25±2°C, it can be charged to 3.65V with constant current of 0.5C, and then, charged continuously with constant voltage of 3.65V until the charged current is less than 0.05C.

#### Fast charge method

25±2°C 1.0C 3.65V 3.65V 0.05C

Under 25±2°C, it can be charged to 3.65V with constant current of 1.0C, and then, charged continuously with constant voltage of 3.65V until the charged current is less than 0.05C.

#### Standard discharge method

25±2°C 0.5C 2.0V

Under 25±2°C, it can be discharged to the voltage of 2.0V with constant current of 0.5C

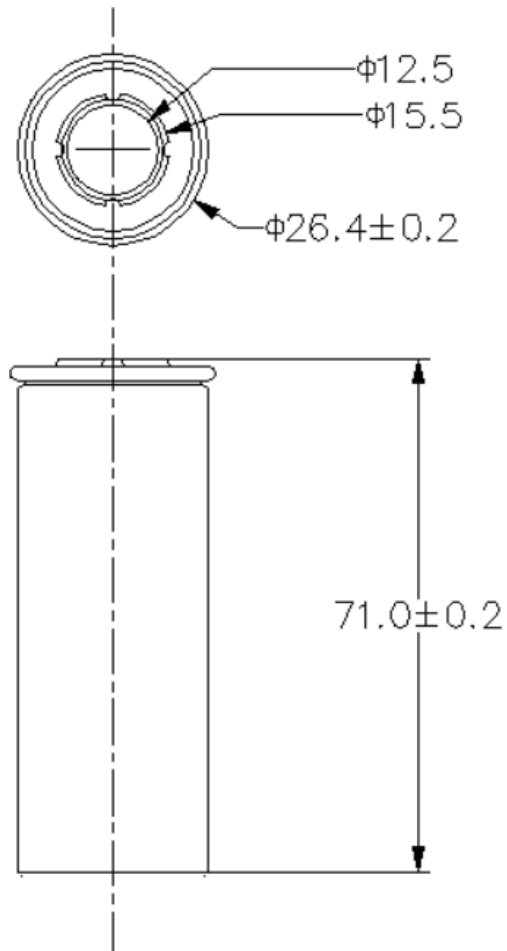
#### Fast continuous discharge method

25±2°C 2.0C 2.0V

Under 25±2°C, it can be discharged to the voltage of 2.0V with constant current of 2.0C.

2 Cell type and dimenstions

Description and model



Cell physical dimension listed Figure1(unit: mm)

1mm

NO	Items	Units: mm
1	Diameter/(D)	$26.4 \pm 0.2$
2	Height/(H)	$71.0 \pm 0.2$

3 Cell specification

Item Description	Specification
Rated Capacity	4000mAh@0.5C
Minimum Capacity	4000mAh@0.5C
Nominal Voltage	3.2V
Charging Method	CC/CV
Charging Voltage	3.65V
End-of-Charge Current	CV Mode:0.05C200mA
Discharge Ending Voltage	2.0V
Standard Charge Current	0.5C(2000mA)
Maximum Continuous Charge Current	1.0C(4000mA)
Standard Discharge Current	0.5C(2000mA)
Maximum ContinuousDischarge Current	2.0C(8000mA)
SOC Recommend SOC Window	10%~90%
Operating Temperature Range	Charging Temperature:0~55°C
	Discharging Temperature:-20~60°C
	3Storage Temperature3 months:-20~45°C
	1Storage Temperature1 year:-20~25°C
	Optimal Temperature15~35°C
AC Impedance	≤20mΩ (AC Impedance, 1000Hz)
Weight	93g

#### 4 Technical characteristics

Cell usage conditions

Temperature of charge 0-55°C

Temperature of discharge -20-60°C

Cell testing conditions

Unless otherwise specified, all tests stated according to following:

Cells should be tested within a month after purchase

5 Charge-discharge times of the testcells should be less than 5

Temperature 25±2°C

Relative Humidity 15%-90%RH

Atmospheric Pressure 86 kPa~106 kPa

Requirement of the testing equipment

10KΩ/V

Voltage meter: The voltage tester internal resistance is  $\geq 10\text{K}\Omega/\text{V}$

0.5°C

Temperature meter: The precision is  $\leq 0.5^\circ\text{C}$

Electronic performance

No	Item	Standard	Test Condition
1	AC Impedance	$\leq 20\text{m}\Omega$	2.2 1000 Hz Cell shall be measured at 1000 Hz after charged per 2.2.
2	Cini Initial Capacity	$\geq 4000\text{mAhCini}$ $\geq 4000\text{mAh}$	2.2 2.4 Cell shall be charged per 2.2 and discharged per 2.4 after full discharge.
3	Rated discharge ability at 25°C	Discharge capacity / Nominal capacity $\times 100\%$ 0.5C(A) $\geq 100\%$ 1.0C(A) $\geq 95\%$ 2.0C(A) $\geq 90\%$ 3.0C(A) $\geq 85\%$	2.2 10 0.5C1.0C2.0C3.0C 2.0V 3 After standard charged per 2.2,the cell undergo a rest for 10 minutes, then is discharged by current of 0.5C(2A), 1C(4A), 2C(8A) and 3C(12A) respectively to cut-off voltage 2.0V. This test is allowed to be repeated for 3 times if the discharge capacity fails to meet the technical requirements.
4	Discharge ability at different temperature	Discharge capacity / Nominal capacity $\times 100\%$ A)55°C $\geq 95\%$ B)-10°C $\geq 65\%$	1). 2.2 55 $\pm 2$ °C 2 0.5C 2.0V 2). 2.2 -10 $\pm 2$ °C 24 0.5C 1.6V 1) .After standard charged per 2.2, the cell undergo a rest for 2h at (55 $\pm 2$ )°C, then is discharged by current 0.5C to cut-off voltage 2.0V; 2).After standard charged per 2.2, the cell undergo a rest for 24h at (-10 $\pm 2$ )°C, then is discharged by current 0.5C to cut-off voltage 1.6V.
5	Cycle Life at Room Temperature	2000 $\geq 80\%$ Capacity retention 2000 <sup>th</sup> $\geq 80\%$	25 $\pm 2$ °C 0.5C 3.65V $\leq 0.05\text{C}$ 30 1.0C 2.0V 30 2000 Cell shall be charged by current 0.5C to 3.65V,then kept at this voltage until the current is less than 0.05C at 25 $\pm 2$ °C; stored 30 minutes,then cell shall be discharged by current 1.0C to cut-off voltage 2.0V; After stored for 30 minutes. tests shall be continued for 2000 times.

No	Item	Standard	Test Condition
6	Capacity Retention and Capacity Recovery at Room Temperature Test	$\geq 85\% \geq 90\%$ Capacity Retention $\geq 85\%$ Capacity Recovery $\geq 90\%$	2.2 25°C±2°C 28 0.5C 2.0V 2.2 30 0.5C 2.0V Cell shall be charged per 2.2, then stored at 25°C±2°C for 28 days. Discharged to 2.0V at 0.5C, test capacity retention. then charged per 2.2, stored 30 minutes, Discharged to 2.0V at 0.5C, test capacity recovery.
7	Capacity Retention and Capacity Recovery at High Temperature Test	$\geq 85\% \geq 90\%$ Capacity Retention $\geq 85\%$ Capacity Recovery $\geq 90\%$	2.2 55°C±2°C 7 0.5C 2.0V 2.2 30 0.5C 2.0V Cell shall be charged per 2.2, then stored at 55°C±2°C for 7 days. Discharged to 2.0V at 0.5C, test capacity retention. then charged per 2.2, stored 30 minutes, Discharged to 2.0V at 0.5C, test capacity recovery.

Environmental characteristics

No	Item	Standard	Test Condition
1	Low-pressure Test	No explosion, no fire, no leakage.	<p>2.2 11.6 kPa 6h 1h</p> <p>Cell shall be charged per 2.2, then stored it for 6h at an absolute pressure of 11.6kPa (RT). Check it for 1h.</p>
2	Drop Test	No explosion, no fire, no leakage.	<p>2.2 1.5m 1h</p> <p>Cell shall be charged per 2.2, then dropped from a height of 1.5m onto the concrete ground. Positive and negative terminals of cells shall be towards the ground. Check it for 1h.</p>
3	Soaking Test	No explosion, no fire.	<p>2.2 3.5 wt% NaCl 2h 1h</p> <p>Cell shall be charged per 2.2, then completely soaking into NaCl solution (3.5 wt%) for 2h. Check it for 1h.</p>
4	Thermal Shock Test	No explosion, no fire, no leakage.	<p>2.2 60min -40 °C 90min 60min 25 °C 90min 85 °C 110min 70min 25 °C 5 1h</p> <p>Cell shall be charged per 2.2, and put into an oven. Temperature inside the oven will drop to -40°C in 60 minutes and remain for 90 minutes. Then it will rise to 25°C in 60 minutes and keep rising to 85°C in 90 minutes, following by remaining for 110 min. And it will drop to 25°C in 70 minutes. Repeat this process for 5 times, then check it for 1h.</p>

Safety characteristics

No	Item	Standard	Test Condition
1	External Short-Circuiting Test	.No explosion, no fire.	2.2 10min 5mΩ 1h Cell shall be charged per 2.2, then short-circuited by connecting the positive and negative terminals with a resistance of <5mΩ for 10 min. Check it for 1h.
2	Over-charge Test	No explosion, no fire.	2.2 1.0C 5.5V 1h 1h Cell shall be charged per 2.2, then charged at 1.0C to ending voltage of 5.5 V or charged at 1.0C for 1h. Check it for 1h.
3	Over-discharge Test	No explosion, no fire, no leakage.	2.2 1.0C 90 1h Cell shall be charged per 2.2, then discharged at 1.0C for 90 minutes. Check it for 1h.
4	Crush Test	No explosion, no fire.	2.2 75 mm (5±1) mm/s 0V 30% 13kN 1h Cell shall be charged per 2.2, then crush the cell perpendicularly to the cell plate at a rate of (5±1) mm/s with a semi-cylinder (radius of 75 mm). When met any of the following criteria, stopping crushing and check it for 1h.  1. Voltage reaches 0V; 2. Deformation reaches 30%; 3. Pressure reaches 13 kN.
5	130 °C Heating Test	No explosion, no fire.	2.2 5°C/min 130°C±2°C 30 1h Cell shall be charged per 2.2, then heated in an oven. Temperature will rise to 130°C±2°C at a rate of 5°C/min and remain for 30 minutes. Check it for 1h.



## 5 Storage and Transportation

Based on the character of cell, proper environment for transportation of pack need to be created to protect the battery.

10%~50% SOC

During transportation, 10%~50% SOC must be kept to ensure that short circuit, appearance of liquid in the battery or immersion of battery in liquid never occur.

-20°C-45°C

Cell should be kept at -20°C-45°C in warehouse where it's dry, clean and well-ventilated.

During loading of battery, attention must be paid against dropping, turning over and serious stacking.

## 6 Precautions and Safety Instructions

In order to prevent the battery leakage, getting hot and explosion, please pay attention to preventing measures as following:

### **Warning!**



Never throw the battery into water. Store it under dry, shady circumstance when not use.



Never misidentify the positive and negative terminals.



Never connect the positive and negative terminals of battery with metal to prevent short-circuiting.



Never ship or store the battery together with metal.



Never knock, throw or trample the battery.



Never cut through the battery with nail or other edge tool.



10~45 °C

Never use or store the battery under the over-high temperature. Otherwise it will lead to battery over-heating, which might lose some function and reduce life, even getting fire. The proposed temperature for long-term storage is 10~45°C.



Never throw the battery into fire or heating machine to avoid fire, explosion and environment pollution; scrap battery should be returned to the supplier and handled by the recycle station.



Never use the battery under strong static electronic and magnetic field, otherwise it will destroy the protecting device.



Never knead eyes if leakage electrolyte gets into eyes. Wash eyes by water and seek medical advice ASAP.



If battery emit peculiar smell, over-heating, distortion or appear any unconventionality during using, storage or charging process, please stop using and take it out of the device.



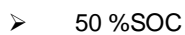
Never cut the battery in socket directly, please use the stated charger when charging.



Check the voltage of battery and relevant connectors before using. Do not use until everything turns out to be normal.



Prior to charging, fully check the insulativity, physical condition and ageing status. The pack voltage must not be less than the cut-off voltage, if not, it needs to be labeled. The user should contact our Customer Service Department. It can't be charged until repaired by our staff.



The battery should be stored in 50% SOC. It needs to be charged once again if out of use for as long as half a year.



Clean the dirty electrode with a clean dry cloth if any contamination appears, otherwise poor contact or operation failure may occur.