

# SPECIFICATIONS

## FOR RECHARGEABLE LITHIUM-ION BATTERY

**MODEL:** HLCF26650P-1500

**CAPACITY:** 1500mAh

**CUSTOMER:** \_\_\_\_\_

**CUSTOMER  
CONFIRM :** \_\_\_\_\_

**DATE :** \_\_\_\_\_

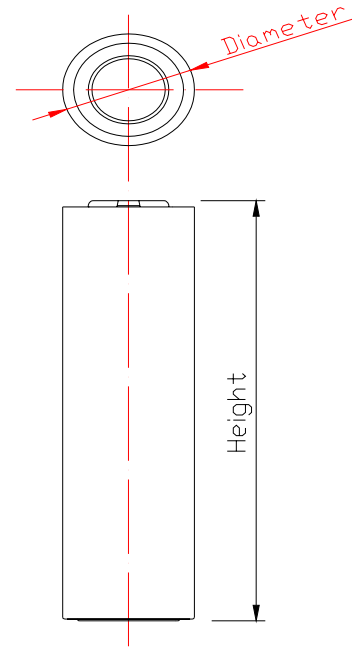
<b>PREPARED</b>	<b>CHECKED</b>	<b>APPROVED</b>

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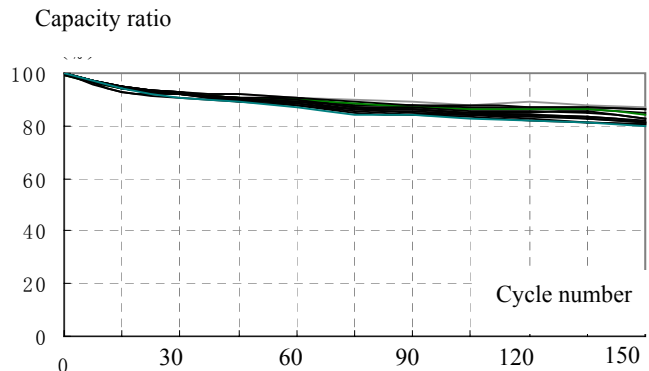
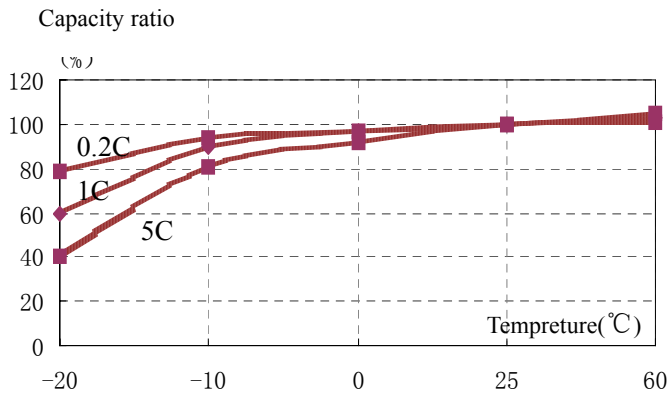
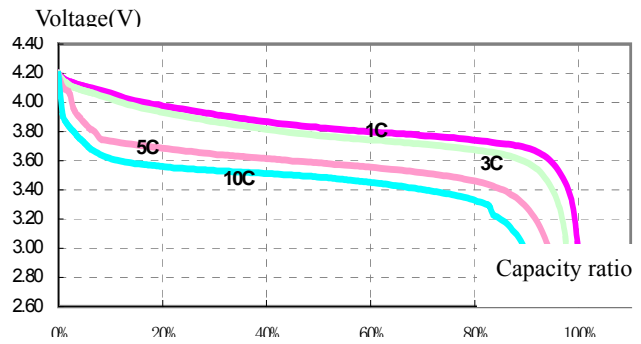
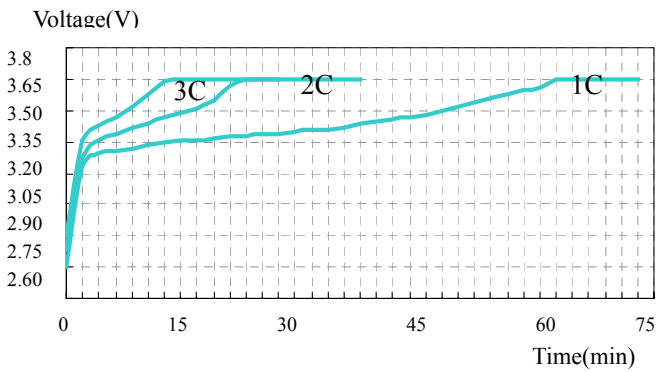
**1.0 SPECIFICATIONS**

Model		HLCF26650P-1500
Can Material		Ni-Iron
0.2C <sub>5</sub> A Capacity (min.)		1500mAh
Nominal Voltage		3.2V
Max. Charge Voltage		3.65 V
Discharge Cut-off Voltage		2.0V
Max. Charge Current		1 C <sub>5</sub> A
Max. Discharge Current		10C <sub>5</sub> A
Diameter		26.0±0.3 mm
Height		65.0±0.3mm
Weight (Approx.)		80.0g
Impedance (Max. at 1000Hz.)		≤20 mΩ (charged status)
Charge Method (CC/CV)	Standard	0.2 C <sub>5</sub> A × 7.5hrs
	Quick	1 C <sub>5</sub> A × 2.5hrs.
Operating Temperature	Charge	0°C ~ 45°C 32°F ~ 113°F
	Discharge	-20°C ~ 60°C -4°F ~ 140°F
	Storage	-20°C ~ 45°C -4°F ~ 113°F

**2.0 CONFIGURATION**



**3.0 CHARACTERISTIC CURVES**



**4.0 CHARACTERISTIC**

**4.1 Electro-chemical Characteristic**

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NO.	Item	Standard	Test Method
1	Discharge Characteristics	Discharge capacity / Nominal capacity $\times 100\%$ A) $1C_5A \geq 100\%$ B) $3C_5A \geq 95\%$ C) $5C_5A \geq 90\%$ D) $10C_5A \geq 85\%$ The curves of charging and discharging should be smooth.	Standard charge at $1C_5A$ under the condition of normal atmospheric pressure and the environmental temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$ and $45\% \sim 80\% \text{ RH}$ (unless otherwise specified, storage and charging should be conducted as this regime), then rest for 10min and discharge at $1C_5A$ , $3C_5A$ , $5C_5A$ , $10C_5A$ to 2.0V respectively. Charge/discharge cycle can be conducted for 3 times before meeting the Standards (the same below).
2	Normal Storage	Residual capacity $\geq$ Nominal capacity $\times 85\%$ Recoverable capacity $\geq$ Nominal capacity $\times 90\%$ OCV decrease $\leq 3\%$ Impedance increase $\leq 20\%$	Measure initial status and initial capacity. Store for 28 days after standard charged and measure final status, then discharge at $1C_5A$ to 2.0V measuring residual capacity; $1C/1C$ measure recoverable capacity. Charge/discharge cycle can be conducted for 3 times before meeting the Requirements.
3	Cycle Life	Capacity $\geq$ Nominal capacity $\times 80\%$	Measure initial status and initial capacity, then conduct $1C/10C$ cycle for 300 times and measure final status.
4	Long Time Storage	$0.2C_5A$ discharge duration stored for 3 months $\geq 4.5\text{h}$ ; stored for 6 months $\geq 4.25\text{h}$ ; stored for 12 months $\geq 4\text{h}$	Measure initial capacity. Measure initial status after charged to $3.40 \pm 0.02\text{V}$ . Measure final status after storage for 3 months, 6 months, 12 months at room temperature respectively. Conduct $1C/0.2C$ cycle for 3 times recording discharge time.

#### 4.2 Safety Characteristic

NO.	Item	Standard	Test Method
1	Overcharge	No fire\explosion Max. temperature $< 130^\circ\text{C}$	Standard charge. Measure initial status to make sure the status of the battery is normal(the same below). Charge at $3C_5A$ to 10.0V, then change to charge with constant voltage till the current less than or equal to $0.01 C_5A$ . Observe the variation of the battery's appearance and temperature.
2	Over Discharge	No fire\explosion	Standard charge. Measure initial status. Discharge at $1C_5A$ to 2.0V and then connect the positive and negative terminals with a resistor of $10\Omega$ for 14 days. Observe the variation of the battery's appearance.

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3	Short Circuit at Room Temperature	No fire\explosion	Standard charge. Measure initial status. Keep the battery into a ventilation cabinet and short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to 50mΩ). Stop the test when the temperature falls to value 10 °C lower than the peak value. Observe the variation of the battery's appearance and temperature.
4	Short Circuit at High Temperature	No fire\explosion	Measure initial status after charged. Keep the battery into a ventilation cabinet of 60±2 °C and store for 3h. Short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to 50mΩ) at this temperature. Supervise the variation of the battery's temperature in the process of the test, stop the test when the temperature falls to value 10 °C lower than the peak value. Observe the variation of the battery's appearance and temperature.
5	Impact	No fire\explosion	Standard charge. Measure initial status. Keep the battery connected with a thermocouple and put it on a impaction platform, place a 15.8mm diameter bar across the center of the biggest surface, then let a 9.1kg heavy hammer self fall off to the platform from a height of 610mm. Observe the variation of the battery's appearance.
6	Nail Penetration	No fire\explosion Max. temperature< 130°C	Standard charge. Measure initial status. Keep the battery connected with a thermocouple on a nail penetration apparatus, then penetrate through it with a 3mm diameter nail rapidly at the center of its height direction. Observe the variation of the battery's appearance and temperature.
7	Crush	No fire\explosion	Measure initial status. Standard charge. Keep the battery connected with a thermocouple and put it into two iron sheets (the biggest surface of the battery should be parallel to the surface of the crush platform) . Apply 13KN force to crush instantly. Observe the variation of the battery's appearance.
8	Hot Oven	No fire\explosion	Measure initial status. Standard charge. Keep the battery connected with a thermocouple and put it into a gravity convection or circulating air oven. Temperature is raised at a rate of 5 °C ±2 °C per minute to a temperature of 150 °C ±2 °C and remained for 30min at this temperature.

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			Observe the variation of the battery's appearance.
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### 4.3 Adaptation to Environment Characteristic

NO.	Item	Standard	Test Method
1	Thermal Cycle	No leakage\smoking \fire\explosion\vent	Standard charge the battery, then store it at $75\pm 2^{\circ}\text{C}$ for 48h, then $-20^{\circ}\text{C}$ for 6h and room temperature for 24h. Then discharge at $1\text{C}_5\text{A}$ to 2.0V. Conduct 1C/1C cycle for 3 times.
2	Static Humidity	No remarkable deformation Norust\smoking\vent\explosion	Standard charge. Put the battery into a $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 95% RH chamber for 168h, then get it out and store it for 2h at room temperature. Observe the variation of the battery's appearance and then discharge at $1\text{C}_5\text{A}$ to 2.0V measuring final capacity.
3	Drop	No leakage\smoking \fire\explosion Discharge capacity / Nominal Capacity $\times 100\% > 85\%$	Measure initial capacity. Standard charge. Measure initial status. Then let it self fall off from a height of 1.2m(the lowest height) to a smooth wooden surface. The self fall off should be conducted from every positive and negative direction of the direction of X,Y,Z (totally for 6 times). Measure final status after drop, then discharge at $1\text{C}_5\text{A}$ to 2.75V measuring residual capacity.
4	High-low Temperature Discharge	Discharge capacity/ Nominal Capacity $\times 100\%$ A) $60^{\circ}\text{C} : \geq 95\%$ ; B) $0^{\circ}\text{C} : \geq 85\%$ ; C) $-10^{\circ}\text{C} : \geq 70\%$ ; D) $-20^{\circ}\text{C} : \geq 60\%$ .  No remarkable deformation No leakage\smoking \fire\explosion	Measure initial capacity and initial status. Standard charge. Then store for 3h at $60\pm 2^{\circ}\text{C}$ and discharge at $1\text{C}_5\text{A}$ to 2.0V, then standard charge at room temperature and store for 20h according to the order of $0\pm 2^{\circ}\text{C} / -10\pm 2^{\circ}\text{C} / -20\pm 2^{\circ}\text{C}$ and discharge at $1\text{C}_5\text{A}$ measuring corresponding discharge capacity. Then store for 2h at room temperature. Measure final status and Observe the variation of the battery's appearance.

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5	Vibration	Residual capacity $\geq$ Nominal capacity *95% OCV decrease $\leq$ 0.5% Impedance increase $\leq$ 20% No remarkable damage\ leakage\smoking \explosion	Standard charge. Measure initial status. Equip it to the vibration platform, adjust and prepare the test equipment according to following vibration frequency and relevant swing, doing frequency sweeping from X, Y, Z three directions, each from 10Hz to 55Hz for 30 minutes of recycling, rating of which is 1oct/min:  A)vibration frequency:10Hz~30Hz Displacement breadth (single swing): 0.38mm B) vibration frequency: 30Hz~55Hz Displacemen tbreadth(single swing): 0.19mm。  Measure final status after sweeping and Observe the variation of the battery’s appearance.
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**Comments:** the definitions of some nomenclatures of this specification

- (1) tandard Charge: Charge with current  $1C_5A$  to limit charge voltage 3.65V under the condition of  $20^{\circ}C \pm 5^{\circ}C$  surrounding temperature, then change to charge with constant voltage till the current less than or equal to 0.01  $C_5A$ .
- (2) Initial Status: Initial voltage、 internal impedance and initial appearance of the battery.
- (3) Final Status: Final voltage、 internal impedance and final appearance of the battery.
- (4) Residual Capacity: The first discharge capacity after being tested by the specific procedure.
- (5) Recovery Capacity: The discharge capacity by implementing charge-discharge cycle repeatedly after being tested by the specific procedure.
- (6)  $1C/1C$  ( $1C/0.2C$ 、  $1C/10C$ ): Charge at  $1C_5A$  to limit charge voltage 3.65V, then change to charge with constant voltage until the current less than or equal to 0.01  $C_5A$ , rest for 5min, then discharge at  $1C_5A(0.2C_5A$ 、  $10C_5A)$  to 2.0V cut-off.

### 5.0 WARRANTY PERIOD& PRODUCT LIABILITY

Warranty period of this product is 6 months from manufacturing code.

HYPERCELL is not responsible for the troubles caused by mishandling of the battery which is clearly against the instructions in this specification.

When HYPERCELL find any new facts which require modification of this document, we will inform you.

### 6.0 INDICATIONS ON BATTERY PACK

The following warnings should be indicated on the battery packs

- Use a specified charger
- Do not throw the battery into fire or heat
- Do not short-circuit the battery terminals
- Do not disassemble the battery

### 7.0 WARNINGS AND CAUTIONS IN USING THE BATTERY

To prevent a possibility of the battery from leaking, heating or explosion please observe the following precautions:

#### WARNINGS!

- Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it

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stands by.

- Do not use or leave the battery near a heat source as fire or heater.
- Use the battery charger specifically for that purpose when recharging.
- The battery only can be soldered on the Al/Ni composite strip of the bottom.
- Do not reverse the position and negative terminals.
- Do not connect the battery to an electrical outlet.
- Do not discard the battery in fire or a heater.
- Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.
- Do not transport or store the battery together with metal objects such as hairpins, necklaces, etc.
- Do not strike, trample or throw the battery.
- Do not directly solder the battery and pierce the battery with a nail or other sharp objects.

## CAUTIONS!

- Do not use or leave the battery at high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- Do not use the battery in a location where static electricity and magnetic field is great, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- If the battery leaks, and the electrolyte get into the eyes, do not rub the eyes, instead, rinse the eyes with clean water, and immediately seek medical attention. Otherwise, it may injure eyes.
- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.
- In case the battery terminals are dirty, clean the terminals with a dry cloth before use. Otherwise performance may occur due to the poor connection with the instrument.
- Be aware discarded batteries may cause fire or explosion, tape the battery terminals to insulate them.