

BATTERY EXPERT (ASIA) PTE.LTD.

1.Scope:

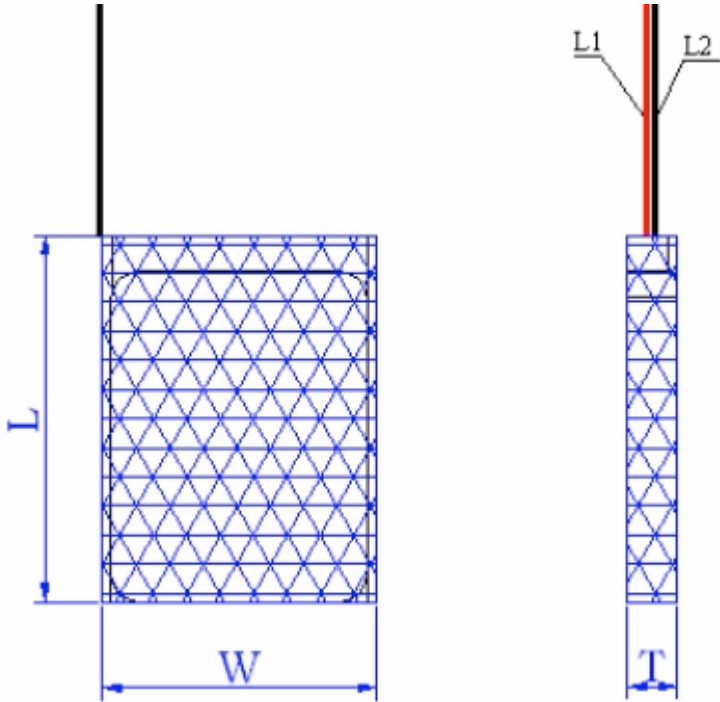
This document describes the Product Specification of rechargeable Lithium Polymer battery .The specification only applies to Battery Expert (Asia) Pte.Ltd.

2.Model: **C.F.L.103450SR**

2.1 Spec.: **3.7V 2000mAh**

2.3 Assembly mode: **1S1P**

2.4 Shipping drawing: (mm)

Drawing					
					
Item	AWG/ Color	Dimension	Item	Description	Dimension
L1	UL1571/28AWG Red	$85 \pm 3\text{mm}$	T	Thickness (Max)	10.5mm
L2	UL1571/28AWG Black	$85 \pm 3\text{mm}$	W	Width (Max)	34.5mm
L3			L	Length (Max)	52mm
Connect Model: no			Other declare:		
Lable content: According to customer's assignment					
Remark: When measuring the cell's thickness, width and length, the stress of the measuring instrument on the cell should be larger than 300gf.					

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3.Specification:

No.	Item	Spec	Note
1	Charge Voltage	4.2V	
2	Nominal Voltage	3.7V	Cell Voltage between 3.7V ~3.9V before shipping
3	Nominal Capacity	2000mAh@ 0.2C Discharge	Nominal Capacity refer to the capacity of 0.2C discharge with 3.0V cut-off voltage, after charging with standard method.
4	Min Capacity	≥1900mAh@ 0.2C Discharge	Min Capacity refer to the capacity of 0.2C discharge with 3.0V cut-off voltage, after charging with standard method.
5	Standard Charge method		0.2C CC charge to 4.2V,then CV charge till charge current decline to ≤ 0.02C
6	Charging time	8 hours(Ref.)	
7	Max. charge current	0.5C	
8	Discharge protection voltage	2.5V/Cell	
9	Max. Discharge Current	0.5C	
10	Discharge Cut-off Voltage	3.0V	
11	Cycle Life	≥ 300 Times	One cycle refer to one charge period and then one discharge period. Test condition: Charge:0.2C to 4.2V Discharge: 0.2C to 3.0V The cycle life is the cycle times when the discharge capacity is about 80% of the rated capacity.
12	Self-discharge	Residual Capacity>90%	After standard charging, stored at 25°C±5°C for 28 days, then measure the capacity as Item 3.
13	Impedance	≤130mΩ	After Standard charging, measure the internal resistance with AC1KHz (while measuring, clip near 2/3 place of the anode and the cathode).
14	Operating Temperature	Discharge:-20℃~+55℃ Charge: 0℃~+45℃	Battery must be stored at 3.8V-3.9V. Over long storage periods cells should be cycled every 90 days. The method is to do a charge-discharge cycle with standard method, then charge to 3.8-3.9V.
15	Battery Weight	Approx 35g	

4. Electronic Characteristics test and safety inspection:

4.1 Standard testing environment

Unless specifically stated otherwise, tests must be done within one month of delivery and the number of charging-recharging cycles is fewer than 5.

Test conditions:

Ambient Temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Ambient Humidity: $65 \pm 20\%$

4.2 The requirements of measurement instruments

- (1) The measurement instrument has been certified by a qualified source.
- (2) The accuracy of the measuring instrument is at least 0.01mm.
- (3) The accuracy of multi-meter is at least 0.5%. While measuring the voltage, the internal resistance can not be less than 10K Ω .
- (4) The principle internal resistance is 1KHz LCR; the accuracy is 0.2%.
- (5) The internal resistance can vary based upon temperature and the charging mode. It is relevant to the PTC and the length and resistance of the wiring.
- (6) The current accuracy of the battery test system is at least $\pm 0.1\%$, isobarically accuracy is $\pm 0.5\%$, and timer accuracy is less than $\pm 0.1\%$.
- (7) The accuracy of the thermometer is at least $\pm 0.5^{\circ}\text{C}$.

4.3 Visual inspection

Any visual defects which will affect the electronic characteristics, such as leakage and damage, are not obvious. The surface is clear and no scratch, no mechanical, match well with the main machine.

4.4 Charge/Discharge Methods and Test Conditions

No.	Item	Testing Condition and Method
1	Charging Current	Standard CC: 0.2C Quick CC: 0.5C
2	Standard Charging	Constant Current Charging at 0.2 C to 4.2V Constant Voltage Charging at 4.2V to cut-off current $\leq 0.02\text{C}$
3	Quick Charging	Constant Current Charging at 0.5C to 4.2V. Constant Voltage Charging at 4.2V to cut-off current $\leq 0.02\text{C}$
4	Standard Discharge	Constant discharge at 0.2C to cut-off voltage of 3.0V
5	Charging Time	Standard charging time: 8 hours Quick charging time: 3.5hours
6	Temperature & Humidity	Standard charging: $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$ 45~85% RH Quick charging: $10^{\circ}\text{C} \sim 45^{\circ}\text{C}$ 45~85%RH Standard discharging: $-20^{\circ}\text{C} \sim 45^{\circ}\text{C}$ 45~85% RH
7	Open Voltage	3.7~3.9V (before shipping)

Notes: The maximum charging voltage shall not exceed 4.2V. The Max. protection voltage designed into the PCM board must not be more than 4.3V.

4.5 Special Electronic Characteristics

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No.	Item	Testing Conditions and Method	Standard
1	Discharge at low temperature	After standard charging, laying the Cells 16h at $-10\pm 2^{\circ}\text{C}$, then discharging at 0.2C to ending voltage, recording the discharging time.	$\geq 210\text{min}$
2	Discharge at high temperature	After standard charging, laying the Cells 2h at $55\pm 2^{\circ}\text{C}$, then discharging at 0.5C to ending voltage, recording the discharging time.	$\geq 108\text{min}$
3	Dimension change at high temperature	After standard charging, storing the cell 4hrs at $85 \pm 2^{\circ}\text{C}$, take out the battery keep room temperature 2h then recording the thickness change of the cell.	$\leq 5\%$

4.6 Mechanical Characteristics

No.	Item	Testing Conditions and Method	Standard
1	Vibration Test	After standard charging, the cell is secured to a vibration table and subjected to vibration cycling in which the frequency is varied at the rate of 1Hz per minute between 10Hz and 55Hz; the excursion of the vibration is 0.38mm. The cell shall be vibrated for 30 minutes on each of X, Y, and Z axis.	No explosion. No smoking. No leakage. Voltage is not less than 3.6V.
2	Shock test	After standard charging, fixed the cell to shock table, then subjected to shock test per axis of X、Y、Z axes and this test condition: Acceleration: 100m/s ² Shock times per minutes: 40~80 times Pulse lasting time: 16ms Shock times: 1000 \pm 10 times	No explosion. No smoking. No leakage. Voltage is not less than 3.6V.
3	Drop Test	The cell is dropped from a height of 1 meter two times onto a 30mm thickness board surface.	No explosion,. No fire. No leakage.

4.7 Safety Test

No.	Item	Testing Conditions and Method	Standard
1	Over-charge	At $20\pm 5^{\circ}\text{C}$ conditions, charging is conducted for 8 hours while the voltage is held at 4.60V, Then check the appearance of battery.	No explosion, no fire, no smoke, no leakage.
2	Over-discharge	At $20\pm 5^{\circ}\text{C}$ conditions, the battery will be discharge with constant current 0.2C to cut-off voltage, then connect with external load of 30 ohm for 24 hours.	No explosion, no fire, no smoke, no leakage.
3	Short-circuit	After standard charge, the battery is short-circuited for 1 hour at 100m Ω . Then check the appearance of battery.	No explosion or fire

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4	Heat shock	The cell is placed in a thermal chamber. Temperature is raised to $120\pm 2^{\circ}\text{C}$ at the rate of $(5\pm 2^{\circ}\text{C})/\text{min}$ and held for 10 minutes, then cooled to room temperature at the rate of $5\pm 2^{\circ}\text{C}/\text{min}$.	No explosion or fire
5	Humidity and heat test	A charged battery is placed in a box for 48 hours where the temperature is $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and the relative humidity is 90%~95% .	No smoke or explosion

5. Storage and Others

5.1 Long-term Storage

If the battery is to be stored for 3 months or longer it should be held in a dry and cool environment. Voltage during storage needs to be maintained between 3.8V and 3.9V and the storage conditions as follow.

5.2 Any issues not covered in this specification should be discussed between the customer and us.

Item		Criteria
Storage temperature	Short period less than 6 month	$-20^{\circ}\text{C}\sim 50^{\circ}\text{C}$
	Long period less than 9 month	$-20^{\circ}\text{C}\sim 45^{\circ}\text{C}$
	Long period more than 12 month	Normal Temperature
Relative Humidity		$\leq 65\% \text{RH}$
Charged		About 50%~60% charged state

6. ESD

At direct discharge against the pins with $\pm 5\text{KV}$ and over the housing with $\pm 10\text{KV}$. No damages are allowed.

7. Protection Circuit Module

7.1 Electrical characteristics

Item	Symbol	Content	Criterion
Over charge Protection	$V_{\text{DET}1}$	Over charge detection voltage (cell)	$4.25 \pm 0.025\text{V}$
	t_{CU}	Over charge detection delay time	$1000 \pm 200\text{ms}$

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	V_{REL1}	Over charge release voltage (cell)	$4.05 \pm 0.025V$
Over discharge protection	V_{DET2}	Over discharge detection voltage (cell)	$2.50 \pm 0.08V$
	t_{DL}	Over discharge detection delay time	$128 \pm 30ms$
	V_{REL2}	Over discharge release voltage (cell)	$3.0 \pm 0.08V$
Over current protection 过流保护	I_{DP}	Over current detection current	$\geq 2A$
	t_{IOV1}	Over current detection delay time	$8 \pm 3ms$
		Release condition	Cut load
	t_{IOV1}	Over current detection delay time	$10 \pm 5ms$
Short protection		Detection condition	Exterior short circuit
		Release condition	Cut short circuit
	t_{IOV2}	Short circuit detection delay time	200-500us
Interior resistance	R_{DS}	Main loop electrify resistance	$V_c=4.0V$ $R_{DS} \leq 70m \Omega$
Current consumption	I_{DD}	Current consume in normal operation	$7 \mu A$ Type
	I	Current in normal operation	0.7A (MOS)