



FELLO TECH CO., LTD
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Type: NP-120
REV: 1.0
Date: 2018-8-30

Specification Approval Sheet

Customer :
Model : NP-120
Type : Li-ion battery
Specification: 3.7V/ 1800mAh

signed by client	
Confirmed	
Checked	
Approved	

signed by manufacturer	
Prepared :	He lu
Checked :	
Approved :	Li Jin Yong

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1. Battery type and scope

This Specification Approval Sheet is for rechargeable Li-ion battery provided by Fello Tech Co., Ltd

1.1 model: NP-120

1.2 scope:

2. Basic characteristic and components of the battery

2.1 Basic performance parameter

S/N	Details	Parameters		Remarks
1	Rated voltage	3.7V		
2	Rated capacity	1800mAh		discharge with 0.2C to 3.0V after fully charge within 1h, measuring the discharge time
	Min. capacity	1800mAh		
3	Limited charge voltage	4.2V		
4	Internal resistance	≤180mΩ		AC 1K Hz at 4.2V
5	Charge mode	C.C/C.V.		
6	Standard Charge current	360mA		
7	Max Charge Current	900mA		0.5C
8	Max discharge current	1800mA		1C
9	Delivery voltage	3.8~3.95V		
10	Working temperature	charging	0~20℃	0.2C
			20℃~45℃	0.5C
		discharging	-10℃ ~ 60℃	
11	Storage temperature	1 Month	-20~45℃	Charge to 40%~50% of capacity when storage
		6 months	-20~30℃	
12	Storage humidity	45%~75%		relative humidity
13	Weight	Approx. 39g		
14	Size	Approx. 11.2 X 35.4 X 53.2mm		
15	Cycle life	≥300 times		

Note:If you need the battery protection parameters, please refer to PAGE 8.

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2.2 Main components and parts

Materials	Model	Quantity	Related technical parameters	Manufacturer
Li-ion cell	FT103450P	1PCS	Please refer to the battery cell specification	FelloTech
Protection board	103450	1PCS		

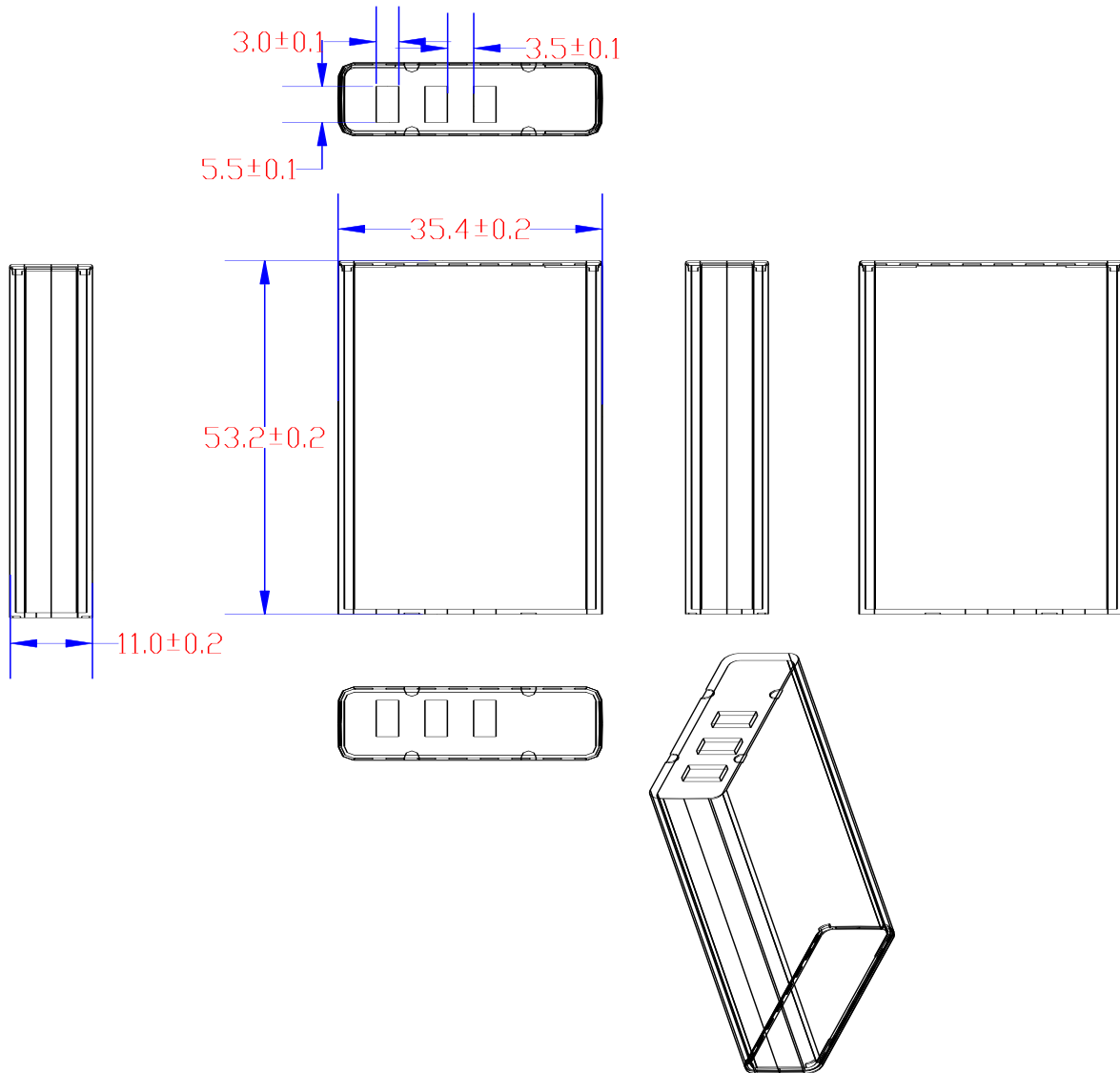
2.3 Reliable performance test

S/N	Inspection item	Standard	Testing Method
1	High temperature	No deformation, no rust, no fire or explosion; Discharge time ≥ 100 mins with $0.5C_5A$ discharge	Place the battery in the environment of $55\pm 2^\circ C$ for 2 hours after fully charge, then discharge with $0.5C_5A$ to cut-off voltage.
2	Low temperature	No deformation, no rust, no fire or explosion; Discharge time ≥ 3 hours with $0.2C_5A$ discharge at $-20\pm 2^\circ C$	After fully charge, place the battery in the environment of $-20\pm 2^\circ C$ for 16-24h, then discharge with $0.2C_5A$ to cut-off voltage. Then display the battery in $20\pm 5^\circ C$ for 2 hours, observe the appearance of the battery.
		No deformation, no rust, no fire or explosion; Discharge time ≥ 3.5 hours with $0.2C_5A$ discharge at $-10\pm 2^\circ C$	After fully charge, place the battery in the environment of $-10\pm 2^\circ C$ for 16-24h, then discharge with $0.2C_5A$ to cut-off voltage. Then display the battery in $20\pm 5^\circ C$ for 2 hours, observe the appearance of the battery.
3	Capability Retention	Discharge time ≥ 4.25 h	After fully charged, store the battery at $20\pm 5^\circ C$ for 28 days, then discharge with $0.2C_5A$ to cut-off voltage.
4	Constant humidity and heat	No deformation, no rust, no smoke or explosion. Discharge time ≥ 36 mins	After fully charge, place the battery in the environment of $40\pm 2^\circ C$ and 90% - 95% Relative humidity for 48 hours, then place it in $20\pm 5^\circ C$ for 2 hours, later, discharge with $1C_5A$ to cut-off voltage.

5	Vibration	No deformation, no rust, no smoke or explosion. Battery voltage $\geq 3.6V$	Batteries are vibrated 30 minutes in three mutually perpendicular directions of X, Y, Z with amplitude of 0.38mm (10~55Hz) and the scanning range of 1oct per minute.
6	Shock	No deformation, no smoke or explosion. Battery voltage $\geq 3.6V$	Vibration test ended, place the battery in the directions of X.Y.Z three mutually perpendicular axis, and set pulse peak acceleration as $100m/s^2$. Then shock the battery with frequency of 40 ~ 80 per minute. The duration of pulse is 16ms, Shock times: 2000 ± 10 .
7	Free Drop	No leakage, no smoke or explosion, but a slight deformation. Discharge time $\geq 100mins$ at $0.5C_5A$ discharge	After shock test, the batteries are dropped on the 18-20mm hardwood on the concrete floor from 2000mm height as per positive and negative 6 direction of X, Y, Z. Each direction should drop one time. After test, batteries can be charged and discharged for at least three cycles.
8	Overcharge Protection	No explosion, no fire, no smoke or leakage	After fully charged, continue to charge the battery for 8 hours with C.C/C.V source. The constant voltage source sets to 2 times nominal voltage and constant current sets $2 C_5A$.
9	Over-discharge Protection	No explosion, no fire, no smoke or leakage.	At $20\pm 5^\circ C$, discharge the battery discharge with $0.2C_5A$ to cut-off voltage. Then, continuously discharge the battery with a 30Ω load resistance for 24 hours.
10	Short-circuit Protection	No explosion, no fire, no smoke or leakage; Batteries voltage is not less than $N*3.6V$ after instantaneous charge.	After fully charge, short-circuit positive and negative electrode with 0.1Ω for 1 hour. Cut-off positive and negative electrode, then charge the battery at $0.5C_5A$ instantaneously for 5S.
11	Thermal Shock	No fire, No explosion	Battery is heated in a circulating air oven at a rate of $(5\pm 2)^\circ C$ per minute to $130^\circ C$, and then placed for 30 minutes at $130^\circ C$.

12	Overcharge	No fire, No explosion	Place battery connected thermocouple in a ventilated cabinet, connect the positive and negative to CC/CV source, and adjust constant current to 3C ₅ A, and constant voltage to N*10V. Charge the battery to N*10V and current to 0 A. Then monitor the changes of temperature. If the temperature of battery drops to about 10°C lower than the max temperature, test is finished.
13	Short circuit	No fire, No explosion. The out side temperature of the battery is less than 130°C.	Place battery connected thermocouple in a ventilated cabinet, short-circuit the positive and negative, then monitor the changes of temperature. If the temperature of battery drops to about 10°C lower than the max temperature, test is finished.
14	Nail	No fire, No explosion	Put battery in the nail test platform. then, use a diameter 8 mm steel tip to poke through into hole. Finally, use a heavy hammer to blow the battery
15	Cycle life	Cycle life ≥ 300	At 20±5°C, charge battery with 0.5 C ₅ A to 4.2V and then charge it with constant voltage to the current less than 20mA. Stop charge and display for 0.5~1 hour. Then discharge it with 1 C ₅ A to cut-off voltage. Display for 0.5 ~1 hour, do next charge and discharge cycle. Repeat these steps. Stop it until the continuous two cycle discharge time is less than 48 minutes.
16	Storage	When it is stored for 3 month, fully charge it, then discharge it at 0.2 C ₅ A, discharge time is not less than 4 hours.	The storage test of battery should be selected a battery which is less than 3 month from production date to the date of experiment. Before storage, battery capacity should be full charged 40%~50% capacity, the ambient temperature is 20°C±5°C and relative humidity is 45%-85%. After the storage expiration of battery, battery should be charged and discharged according to fully charged and discharged.

2.4 Dimension of the Battery



Unit: mm

3.Specifications of Parts

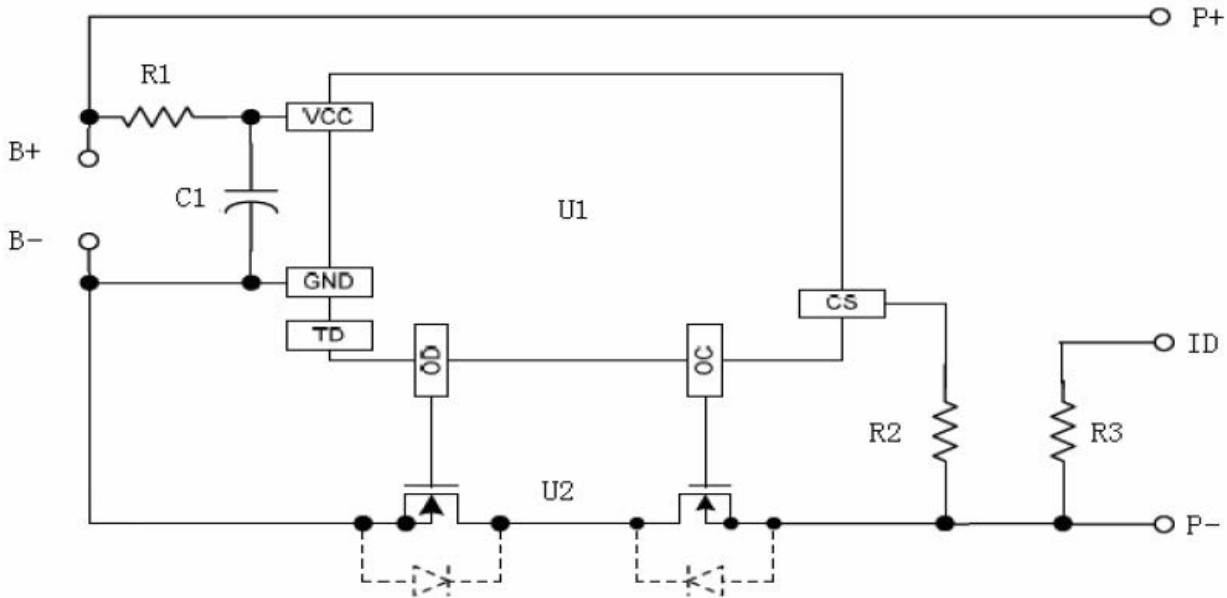
3.1: PCB:DW01+, 8205A,

3.1. 1: General electric characteristic

Model of Protection IC: DW01+

Items	Specification	Remarks
Over-charging Protection Voltage	4.3V±0.025V	
Over-charging Return Voltage	4.0V±0.10V	
Over-discharge Protection Voltage	2.4V±0.1V	
Over-current Protection	2-6A	
Detection Delay Time of Over-charging Protection	50-270ms	
Detection Delay Time of Over-discharging Protection	15±10ms	
Detection Delay Time of Over-current Protection	5-26ms	
Detection Delay Time of Output short-circuit Protection	≤50us	
Internal Resistance of Proper Functioning	≤60mΩ	
Consume Current	3.0uA Type 6.0ua Max	
Operating Temperature	-20~75°C	

3.2: Electric schematic diagram



3.3 : Components of the Fender Lists

No.	Name of the components	Position	Specification	Precision%	Qty	Supplier	Remarks
1	PCB		103450	Negative tolerance	1		Latten
2	Internal Resistance	R1	SMD100Ω	±5	1		0603
3	Internal Resistance	R2	SMD1KΩ	±5	1		0603
4	Internal Resistance	R3	10KΩ NTC	±1	1		0603
5	Capacity	C1	SMD 0.1uF		1		0603
6	Protect IC	U1	DW01	/	1		SOT-23-6
7	MOS-FET	U2	8205A	/	1		SOT-23-6

4 Specifications of the Cell

NO.	Items	Parameters	Tolerance	Term	Remark/ condition
1	Appearance	No mechanical damage, leakage , sink ,drum and so on	/	50cm distance under 40W daylight lamp	Visual
2	Dimensions	Length	50mm	Max 50mm	Digital caliper
		Width	34mm	Max 34mm	
		Thickness	10mm	Max 10mm	
3	Voltage	≥3.85V	/	Multimeter	
4	Rated capacity	1800mAh	/	0.2C	
5	Internal resistance	≤60mΩ	/	1KHz	/
6	Consistency	Appearance quality is the same			
7	Security	Correspond to related safety performance			

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Attentions

Danger

To prevent battery from weeping, fever, exploding ,please obey the rules as follows:

- Do not immerse the battery into the water or the sea, Guard against Damp;
- Do not approach the heat source, like fire or heater;
- Please use the appointed charger when charging;
- Do not transposition the +.- poles of the battery to charge;
- Do not direct-connected the battery to alternating current power supply, or auto ignition of the vehicle;
- Do not discard the battery to the fire or hyper pyretic objects;
- Do not use the conductor to lead the short circuit of the + -poles of the battery. Do not put the battery with metallic conductors to transport or store, like necklace, hairpin and so on;
- Do not beat or throw the battery;
- Do not impale the battery with needle or some other sharp things, do not strike it with weight;

As installed safety device in the battery, please do not resolve or change any other sections of the battery to protect the inherent safety functions

Warnings

- Do not put the battery to the microwave oven or pressure tank;
- Do not use the battery with some chemical batteries (like dry battery) or different capacities and brands battery together, if the battery emits the smell, heat , changes color, be out of shape or appears any other abnormal phenomena during the charging or stored procedures, please get out the battery from the device or charger and stop using;
- If can not recharge within the charging period, please not continue charging;
- Put the battery to where the kids can not touch, if the kids swallow the battery , please seeing the doctor soon;
- If the electrolyte of the battery into the eyes, do not rub ,should wash the eyes first ,then see the doctor;



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Announcements

Do not put the battery under the high temperature places (like sunshine irradiation or car in the hot weather), or it will catch fire for the heat , reduce the performance and loss the life;

To insure the safety, the battery should install the safety device, please not use when the static electricity is more than we need when produce, or the safety device will lose efficacy and lead the overheating ,fracture, exploding and catching fire;

Please use the battery in normal as follows, or it will be overheating, caught fire , reduced performance and shorten the life;

Environment condition

(Temperature) Charging: 0~+45⁰C

Discharging: -20~+60⁰C

Store within 30 days: -10~+45⁰C

Store within 90 days : -10~+35⁰C

If the kids use the battery, they should use as the operation instruction manual and guarantee that it must be use in normal at any time;

If the battery weeps, the electrolytes stick on the skin or cloth, use the water to wash or running water to wash
To insure not install the battery wrong or wastage of the battery, please read the instruction carefully to install and dismounting;

If the battery will not be used for a long time ,please take out of the battery from the device and store in dry and shady places;

If there is sludge on the surface of the battery, please wipe up clean before using, or it will lead bad contact with the device

! Special Notice

Keep the cells in **50% charged state** during long period storage. We recommend to charge the battery up to 50% of the total capacity every 6 months after receipt of the battery and maintain the voltage 3.8V~4.0V. And store the battery in cool and dry place.