Product specification

Cylindrical Li-ion battery pack

Customer:

Battery pack model: 6.4V/20Ah

Revision	Revised history		Issue Date
A0	The new release		2020-9-21
Prepared by	Checked by	Approved by	Customer approval

Content

1. Scope

This product specification describes performance indexes for cylindrical Li-Ion battery pack. This product specification applies for cylindrical Li-Ion battery pack that produces by Shenzhen GSL Tech Co., Ltd.

2. Composition table for battery pack

Battery pack Mode	Combination mode	Composition table	
		Cell type	Protection board model
6.4V/20Ah	2S6P	3.2V 26650 3400mAh	2S PCM

3. Performance index for battery pack

Item(s)		Specification	Remark
Nominal voltage (V)		6.4	
Nominal Capacity（Ah）		20	
Charging	Charging voltage Max. (V)	7.3	
	Continue charging current Max. (A)	≤15	
Discharging	End of discharging voltage Min.(V)	4	
	Continue discharging current Max. (A)	≤15	
Operation temperature (℃)	Charging	0℃～45℃	
	Discharging	-20℃～60℃	
Internal resistance(mΩ)		≤120	AC 1kHZ
Weight (Kg)		≈1.3	
Size (mm)		151x65x94	

4. Parameters table for protect circuit board

Item	Symbol	Content	Criterion
Over charge Protection	V_{DET1}	Over charge detection voltage	3.65±0.05V
	tV_{DET1}	Release voltage for over-charging	3.45±0.1V
Over discharge protection	V_{DET2}	Over discharge detection voltage	2.0±0.1V
	tV_{DET2}	Release voltage for over-discharging	2.5±0.1V
Over current protection	I_{DP1}	Over current detection current 1	35±5A
	tV_{DET3}	Detection delay time	50~250mS
Cell balance		Bleed StartPoint	--
		Bleed Current	--
		Balance Mode	--
Interior resistance	R_{SS}	Main loop electrify resistance	R_{SS}≤20mΩ
static current	I_{DD}		≤50μA
Suggest working current	I	Max continuous charge/discharge current	≤15A
Temperature Protection	T	--	--

5. Product Picture

6. Performance index and/or specification for cell

6.1 Description and model

6.1.1 description: Cylindrical Li-ion battery

6.1.2 model: IFR26650E3.4Ah

6.2 Definition

6.2.1 Rated capacity

Rated capacity:Cap=3400mAh.under 25±2℃,It means the capacitay value of being discharged by 5-hours rate to end voltage 2.00V,which is signed Cap ,the unit is mAh.

6.2.2 Standard charge method

Under 25±2℃,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 0.05C.

6.2.3 Standard discharge method

Under 25±2℃,it can be discharged to 2.00V with constant current of 1C.

6.3 Nominal Specification

Item		Specification	
Nominal capacity		3400mAh@0.2C	
minimum capacity		3400mAh@0.2C	
nominal voltage		3.2V	
energy density		125Wh/kg	
min. discharging voltage		2.00V	
max. charging voltage		3.65±0.03V	
std. charging current		0.5C_5A	
std. discharging current		1.0C_5A	
max. charging current		0.5C_5A	
max. discharging current		3.0C_5A	
max. recommended charge and discharge cell surface temperature		Charge: 0～45℃ Discharge: -20～60℃	
Internal Impedance		≤25mΩ (AC Impedance,1kHz)	
weight		≈86g	
Cell dimension		max. height: 65.9mm max. diameter: 26.5mm	
Cell storage and transportation environment and temperature ranges	<1 month	-20～+35℃；<75%RH*	Initial status of cell 3.6V and 50% of charge, the capacity lost during shipment < 20%. Capacity recover rate > 80%
	<3 months	-20～+30℃；<75%RH*	
	<12 months	-20～+25℃；<75%RH*	

6.4 Electrical Characteristics

Discharge rate capability	Temperation: 25±2℃ Charger: CC/CV 0.5C 3.65V; End current: 0.05c Discharger: CC Tect current; End voltage: 2.00V $\frac{\text{discharge capability at 0.5C}}{\text{discharge capability at 0.2C}} \geq 95\%$ $\frac{\text{discharge capability at 1.0C}}{\text{discharge capability at 0.2C}} \geq 92\%$

	$\frac{\text{discharge capability at 3.0C}}{\text{discharge capability at 0.2C}} \geq 90\%$
Cycle life	Temperation:25±2℃ Charger: CC/CV 0.5C 3.65V; End current: 0.05c; Rest time: 0.5 h Discharger: CC 1C; End voltage: 2.00V; Rest time: 0.5 h $\frac{\text{discharge capability of 2001th cycle}}{\text{Original discharge capacity}} \geq 80\%$
temperature discharge performance	Charger: CC/CV 0.5C 3.65V; End current 0.05c Discharger: CC 0.2C; End voltage: 2.00V $\frac{\text{discharge capability at } -10^{\circ}C}{\text{discharge capability at } 25^{\circ}C} \geq 70\%$ $\frac{\text{discharge capability at } 0^{\circ}C}{\text{discharge capability at } 25^{\circ}C} \geq 80\%$ $\frac{\text{discharge capability at } 60^{\circ}C}{\text{discharge capability at } 25^{\circ}C} \geq 95\%$
Storage performance	A cell is charge in accordance with 3.2, and stored in an ambient temperature of 25±2℃ for 28d, then discharged to cut-off voltage at a constant current of 0.2C. $\frac{\text{residual capacity}}{\text{Original discharge capacity}} \geq 90\%$

6.5 Environmental characteristics

Item	Test Method	Criterion
Vibration	A cell is charge in accordance with 3.2, then installed onto the vibration desk with clamps, Equipment parameters of frequency and amplitude are as follow(the frequency is to be varied at the rate of 1 oct/min between 10 and 55 herts, and repet vibration for 30 min. The cell is to be tested in three mutually perpendicular directions); Frequency: 10Hz~30Hz amplitude:0.38mm Frequency: 30Hz~55Hz amplitude:0.19mm	1) NO scratch, no leckage, no fire, no explosion, no vent; 2) The voltage is not less than 3.0V.
Temperature Test	A cell is charge in accordance with 3.2, then heated the cell to be in a oven. Then the temperature of the oven is to be raised to the temperature of 65±3℃ and remain for 4 h at that temperature,then the temperature of the oven is to be dropped to the temperature of 20±3℃ and remain for 4 h at that temperature, then the	No leakage, no fire, no explosion, no vent

	temperature of the oven is to be dropped to the temperature of - 20±3℃and remain for 4 h at that temperature, repeat this for another 9 cycles,after that put the cell in room temperature for at least 24 hrs, then chack cell's appearance.	

6.6 Safety Characteristics

Item	Test Method	Criterion
Short Circuit	A cell is to be short-circuited by connecting the positive and negative terminals of the battery with an external load of less than 50 mΩ until the surface temperature decrease 10 degree from the highest point.	No fire, no explosion
Over charge	A cell is discharged to cut-off voltage at CC of 0.2C.then it is to be subjected to CC/CV power by connecting its positive & negative terminal, then set the current as 10A,the voltage as 10V,after that, Charge the cell up to 10V at CC of 10A ,until that last 7h at the voltage of 10V.	No fire, no explosion
Forced-Discharge	A cell is discharged to voltage 0V at a constant current of 1C.	No fire, no explosion
Heating	A cell is to be heated in a circulating air oven. The temperature of the oven is to be raised at a rate of 5℃ ±2℃ per minute to a temperature of 130℃±2℃ and remain for 30min at that temperature before the test is discontinued.	No fire, no explosion
Drop	A cell is charged in accordance to standard charge method and stored for 1~4h, then dropped from a height of 1000mm to a wooden board(18-20mm thick) which is placed on the concrete ground. Cells shall be dropped from top, bottom and diameter side. Each side drop 3 and repeat two times.	No leakage, no smoking, no fire, no explosion
Remarks	All above safety tests will be conducted at 25℃±5℃ except where specified differently. Use proper ventilation with protective equipment.	

6.7 Warning and cautions in handling the lithium-ion cell

TO prevent the possibility of the cell from leaking, heating, explosion, please observe the following precautions:

Warning!

6.7.1 Don't immerse the cell in water.

6.7.2 Don't use and leave the cell near a heat source such as fire or heater.

6.7.3 When charging, use a cell charge specifically for that purpose.

6.7.4 Don't reverse the positive and negative terminals.

6.7.5 Don't connect the cell to an electrical outlet directly.

6.7.6 Don't discard the cell in fire or heater.

6.7.7 Don’t connect the positive and negative terminal directly with metal objects.

6.7.8 Don’t transport and store the cell together with metal objects such as necklaces, hairpins.

6.7.9 Don’t strike,throw or trample the cell.

6.7.10 Don’t pierce the cell with a nail or other sharp object.

Caution!

6.7.11 Don’t use or leave the cell at very high temperature conditions (for exampie, strong direct or a vehicle in extremely ho t conditions).

6.7.12 If the cell leaks and the electrolyte get into your eyes, don’t wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention.Otherwise, eyes injury an result.

6.7.13 If the cell gives off an odor,generates heat, becomes discolored or deformed, or in any way appear abnormal during usage, recharging or storage, immediately remove it from the device or cell charger and stop using it.

6.7.14 In case the terminals get dirty, clean the terminals with a dry cloth before use.

6.7.15 If the cell beyond the useful-life, please fully discharge, sticks the cell with insulating tape, then put the cell to the specialized recycle bin.