Specification Approval Sheet(PACK)

Battery Type：IFR26650-30M

Content

1. Scope

The specification is suitable for the performance of Lithium iron phosphate Battery produced by Akyga battery

2.Model:IFR26650-30M

3.Specification

NO.	Items	Specifications
1	Charge voltage	3.65V
2	Nominal voltage	3.2V
3	Nominal capacity	3000mAh 0.5C Discharge
	Minimum capacity	2900mAh 0.5C Discharge
4	Standard Charging method	0.5C CC （ constant current ） charge to 3.65V,then CV(constant voltage 3.65V)charge till charge current decline to ≤0. 02C
5	Max charge current	6000mA
6	Standard discharge current	3000mA
7	Maximum continuous discharge current	9000mA
8	Maximum peak curren	15000mA
9	Discharge cut-off voltage	2.0V
10	Operating temperature	Charging： 0℃~60℃ Discharging：-20℃~70℃
11	Storage temperature	-20℃~ 45℃
11	PACK Weight	Approx：85.5g

4.Battery PACK Performance Criteria

4.1 Electrical characteristics

NO.	Items	Test Method and Condition	Criteria
1	Standard Charge	Charge with 0.5C constant current to 3.65V first, and then charge with a constant voltage of 3.65V until the charging current is 0.02C	
2	Rated Capacity	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.5C with 2.0V cut-off voltage after standard charge.	≥3000mAh
3	Cycle Life	Test condition： Charge:0.5C to 3.65V Discharge:0.5C to 2.0V 80% or more of 1st cycle capacity at discharge of Operation	≥2000
4	Self-discharge	After the standard charging, storied the cells under the condition as No.4.4 for 30 days, then measured the capacity with 0.2C till 2.0V	Residual capacity >80%
5	Initial impedance	Internal resistance measured at AC 1KHz after 50% charge	≤100mΩ
6	PACK Voltage	As of shipment.	≥3. 2V
7	Temperature Characteristics	1. According to item 4.1.1, at 23±5℃. 2. Capacity comparison at each temperature, measured with constant discharge current 0.2C with 3.0V cut-off. Percentage as an index of the capacity compared with 100% at 23℃	-10℃： ≥65% 23℃： 100% 45℃： ≥90%
8	Storage Characteristics	1. According to item 4.1.1,at 23±5℃. 2. The battery shall be stored at 45±5℃ for 4 hours (measure thickness) and rested at room temperature for 2 hour then measured with constant discharge current 0.2C with 2.0V cut-off.(measure Capacity)	Retained Capacity ≥95% Retained Thickness ≤10%

4.2 Mechanical characteristics

NO.	Items	Test Method and Condition	Criteria
1	Vibration Test	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz an 55Hz,the excursion of the vibration is 1.6mm.The cell shall be vibrated for 30 minutes per axis of XYZ axes.	No leakage No fire
2	Drop Test	The cell is to be dropped from a height of meter twice onto concrete ground.	No fire, no leakage.

4.3 Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

4.4 Standard environmental test condition

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature：23±5℃

Humidity: 65±20%RH

5.Storage and Others

a) Long Time Storage

If the Cell is stored for a long time, the cell's storage should be 3.2~3.3V and the cell is to be stored in a condition as No.4.4。

b) Others

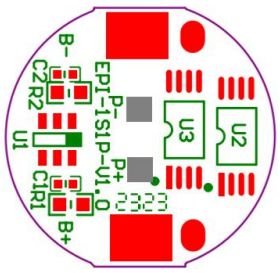
Any matters that this specification does not cover should be conferred between the customer and

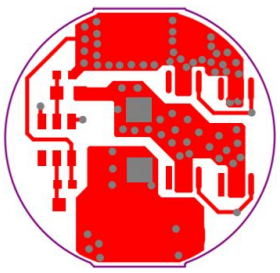
6. Protection Circuit Characteristics (at 25℃)--This specification item is option.

6.1Electrical Characteristic

Details		Min.	Typ.	Max	Error	nit
Battery Link			1S			
Battery Gas			3.2V			
Input Charging Voltage			3.65			V
Input Charging Current				6.6		A
Output Discharging Voltage			2.0			V
Continuous Output Discharging Current				9.9		A
Ambient Condition	Operating Temperature	-20	25	70		℃
	Humidity (No Water-Drop)	0%		90%		RH
Storage Condition	Temperature	-20		45		℃
	Humidity (No Water-Drop)	0%		90%		RH
Protection Parameters (for Individual Cell).						
Over-Charge Voltage Protection (OVP)			3.650		±25mV	V
Over-Charge Voltage Protection Release (OVPR)			3.60		±50mV	V
Over-Discharge Voltage Protection (UVP)			2.00		±80mV	V
Over-Discharge Voltage Protection Release (UVPR)			2.20		±100mV	V
Over-Current Discharge Protection (OCDP)			15		±2A	A
Over-Current Protection Delay Time (OCPDT)			1000		±500mS	mS
Over-Discharge Protection Release			Charge activate			
Over-Current Discharge Protection Release			Release load			
Short circuit current protection			Enable			
Short circuit current protection delay time			100	300	600	uS
Short circuit protection Release			Release load			
Idle mode			≤35			uA
Main loop electrify resistance			≤65			mΩ
PCBA Size		17.5（±0.50）×17.5(±0.30）×0.8（±0.1）				mm

6.2 PCB Pad description

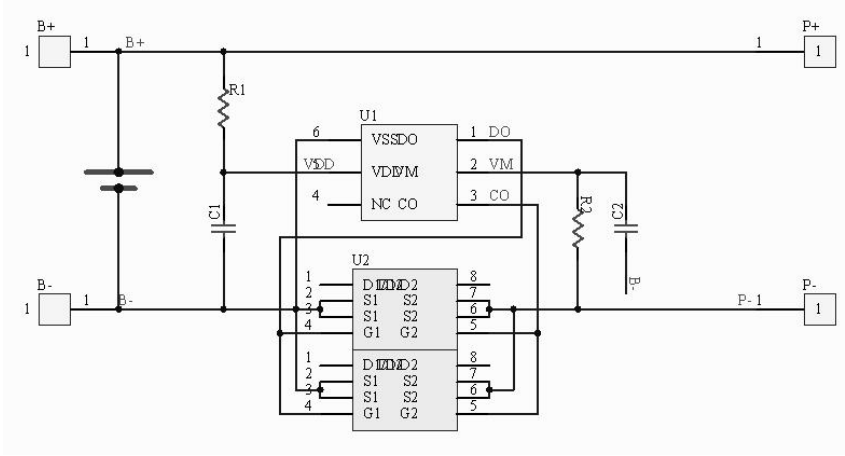




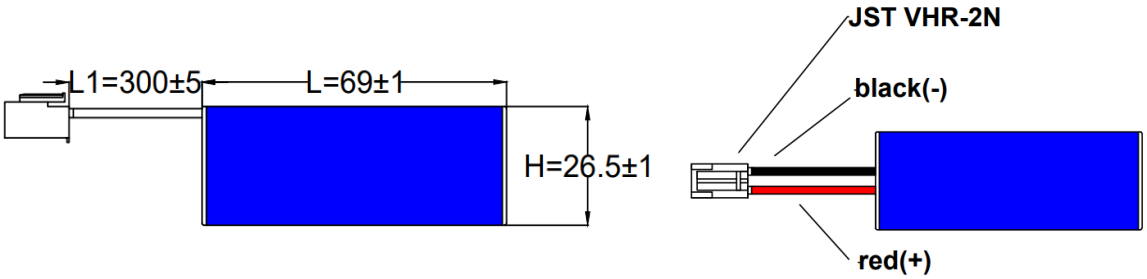
6.3 PARTS LIS

NO.	Symbol	Parts name	Package	Description	Qty
1	U1	Protection IC	SOT-23-6	CM1002-J	1
2	U2, U3	N-MOSFET	TSSOP-8	PA2012	2
3	R1	Resistor	0603	1KΩ ±5%	1
4	R2	Resistor	0603	2KΩ ±5%	1
5	C1	Capacitor	0402	25V, 0.1uF, X7R	1
6	B+, B-		/	4*3*0.3mm	1
7	/	PCB	/	TD-1S1P-V1.0	1

6.4 Application Circuit



7. Pack Drawing



7.1Soft pack drawing (Product Outer Dimension：

NO.	Item	Specifications
1	H	26.5±1mm
2	L	69±1mm
3	L1	300±5mm

7.2BOM of Product

	Item	Model	Specification	Remarks
1		JST VHR-2N 20#(3239)	Line length：300±5mm	1
2	PCM	Li-ionsingle cell PCM	Over Voltage Protect: 3.65±0.025V Over Discharge Protect: 2.0±0.08V	1
3	Tape	Kapton	See figure	
4	Cell	LFP26650	3000mAh	1

Appendix

Handling Precautions and Guideline
For Lithium iron phosphate Battery

Preface

This document of' Handling Precautions and Guideline Lithium iron phosphate Battery shall be applied to the battery cells manufactured by Akyga battery

Note(1):

The customer is requested to contact Akyga battery in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

Note(2):

Akyga battery will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

Note(3):

Akyga battery will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the cell, if it is deemed necessary.

1. Charging

1.1 Charging current:

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical and safety performance and could lead to heat generation or leakage.

1.2 Charging voltage:

Charging shall be done by voltage less than that specified in the Product Specification (3.65V/cell). Charging beyond 3.65V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

1.3 Charging temperature:

The cell shall be charged within 0℃~60℃ range in the Product Specification.

1.4 Prohibition of reverse charging:

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring, In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

2. Discharging

2.1 Discharging current

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

2.2 Discharging temperature

The cell shall be discharged within -20℃~70℃ range specified in the Product Specification.

2.3 Over-discharging:

It should be noted that the cell would be at over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.2 Vand 3.3V.

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voyage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows:

The cell battery pack shall start with a low current (0.01C) for 15-30 minutes, i.e.-charging, before rapid charging starts. The rapid charging shall be started after the (individual) cell voltage has been reached above 2.2V within 15-30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) cell voltage does not rise to 2.2V within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

3. Storage

The cell shall be storied within 0℃~45℃ range environmental condition.

If the cell has to be storied for a long time (Over 3 months),the environmental condition should be: Temperature: 23±5℃

Humidity: 65±20%RH

The voltage for a long time storage shall be 3.2V~3.3V range.

4. Handling of Cells

Since the battery is packed in soft package, to ensure its better performance, it’s very important to carefully handle the battery

4.1 Soft Aluminum foil

The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles.

- Don't strike battery with any sharp edge parts
- Trim your nail or wear glove before taking battery
- Clean worktable to make sure no any sharp particle

4.2 Folding edge

The folding edge is form in battery process and passed all hermetic test

- Don't open or deform folding edge

4.3 Mechanical shock

- Don't Fall, hit, bend battery body

5. Notice Designing Battery Pack

5.1 Pack design

- Battery pack should have sufficient strength and battery should be protected from mechanical shock
- No Sharp edge components should be inside the pack containing the battery.

6 Notice for Assembling Battery Pack

6.1 Cell fixing

- The battery should be fixed to the battery pack by its large surface area.
- No cell movement in the battery pack should be allowed.

7. Others

7.1 Prevention of short circuit within a battery pack

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

7.2 Prohibition of disassembly

1）Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, or other problems.

2）Electrolyte is harmful

LFP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

7.3 Prohibition of dumping of cells into fire

Never incinerate nor dispose the cells in fire. These may cause firing of the cells, which is very dangerous and is prohibited.

7.4 Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater drinks such as soft drinks, juices coffee or others.

7.5 Battery cells replacement

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

7.6 Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of electrolyte, electrolyte leakage and others, the cells shall never be used any more.

The cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing.