

Specification Approval Sheet

Product : Lithium Polymer Battery pack

Model : GMB10140190

Spec : GMB0910190073

Agree	Check	Make

confirmation	Sign	Date
	Company :	
	Stamp :	

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1. Scope

This document describes the Product Specification of chargeable Lithium Polymer Battery produced by Guangzhou Markyn Battery Co.,Ltd.

2. Battery pack configuration and function

1. 10140190 battery pack is composed by four parts:

1.1 the plastic part of the battery pack(color、 print、 label content according to customer requirement).

1.2 Cell:

Type:	LI-Polymer
Model:	10140190
Spec:	20Ah
Cell's assemble:	7S, voltage:25.9V。

1.3 Module: Important part of the battery pack. It has much function that over-charge protection, over-discharge protection, over-current protection and so on.

1.4 Other parts: the accessories for packing, such as the sponge which is used for fix up, avoiding to drop.

2. Battery (PACK)basic performance

Item		Parameter	Remark
Normal characteristic	Nominal capacity	20Ah	0.2C discharge 25±5℃
	Nominal voltage	25.9V	
Charging Characteristics	Charging method	CC/CV	
	DC input voltage	29.0~29.4V	
	Solely DC input charge current	5.0A±0.1A	Charge the battery only
	Voltage after full charge	28.5~29.4V	PACK+;PACK-
	Individual charging time	约 6h	
	Temperature during charging	0℃~+45℃	
Discharge characteristics	Discharge current(standard)	30~50A	
	Cut-off voltage	20.0-22.0V	
	Temperature during discharging	-10℃~+60℃	
Impedance		≤100mΩ	After standard charging, measure the resistance of

			AC1KHz under the temperature of 25 ±5°C.PACK+and PACK-port
Protection function	It has the function that is overcharge protection, over-discharge protection, over-current protection and short circuit protection.		
Self-discharge	When the battery pack has no load, because of the cell's protect circuit, there's operation current's consume, it causes the battery pack's voltage decreased. Please take care to charge the battery when the storage time is longer, please see the 7item for detailed information.		
Storage temperature	within 1 month	-5 °C~+45°C	Relative humidity 65 ± 20%RH Voltage:3.8±0.1v
	within 3 month	-5 °C~+35°C	
	within 6 month	0 °C~+35°C	
Cycle life	Under 25°C, ≥300times		
Battery pack status when shipping	It has been charged 35~50% of capacity when shipping, voltage is 45.5~50.0V.		

3. PCM Performance

3.1 Environment

- 3.1.1 Operation temp -10°C~+45°C relative humidity<80%
- 3.1.2 Storage temp -20°C~+65°C relative humidity<80%

3.2 Main components

- 3.2.1 SA45141
- 3.2.2 MOS-FET AOT430

3.3 Electronic performance parameter

Item	Min.	Typical	Max.	Remark
Overcharge protect voltage(V)	4.3	4.35	4.4	Single cell
Overcharge protect retard time(s)	0.5		2	
Overcharge protect resume voltage(V)	4.10	4.15	4.20	Single cell
Over-discharge protect voltage(V)	2.60	2.85	3.0	Single cell
Over-discharge protect retard time(ms)	0.5		2.0	
Overdischarge protect resume voltage(V)	2.8	3.0	3.2	
Over-current protect retard time(s)	0.5		3	
✧ The above protect function is for single cell only, when the cells in assembled, as long as any one of the cells reaches to the protect key, all the cells is protected.				

3.4 PCM function

Charging function : The function has only cell circuit protection.

3.4.1 cell protection circuit

3.4.1.1 over-charge: During charging, when the cell's voltage over the overcharge voltage, the overcharge protect circuit worked, and it will be cut when reach to retard time.

Overcharge protection	Protect voltage	4.35V /cell
	Protect retard time	1.2S
	Protect unchain voltage	4.15V/cell

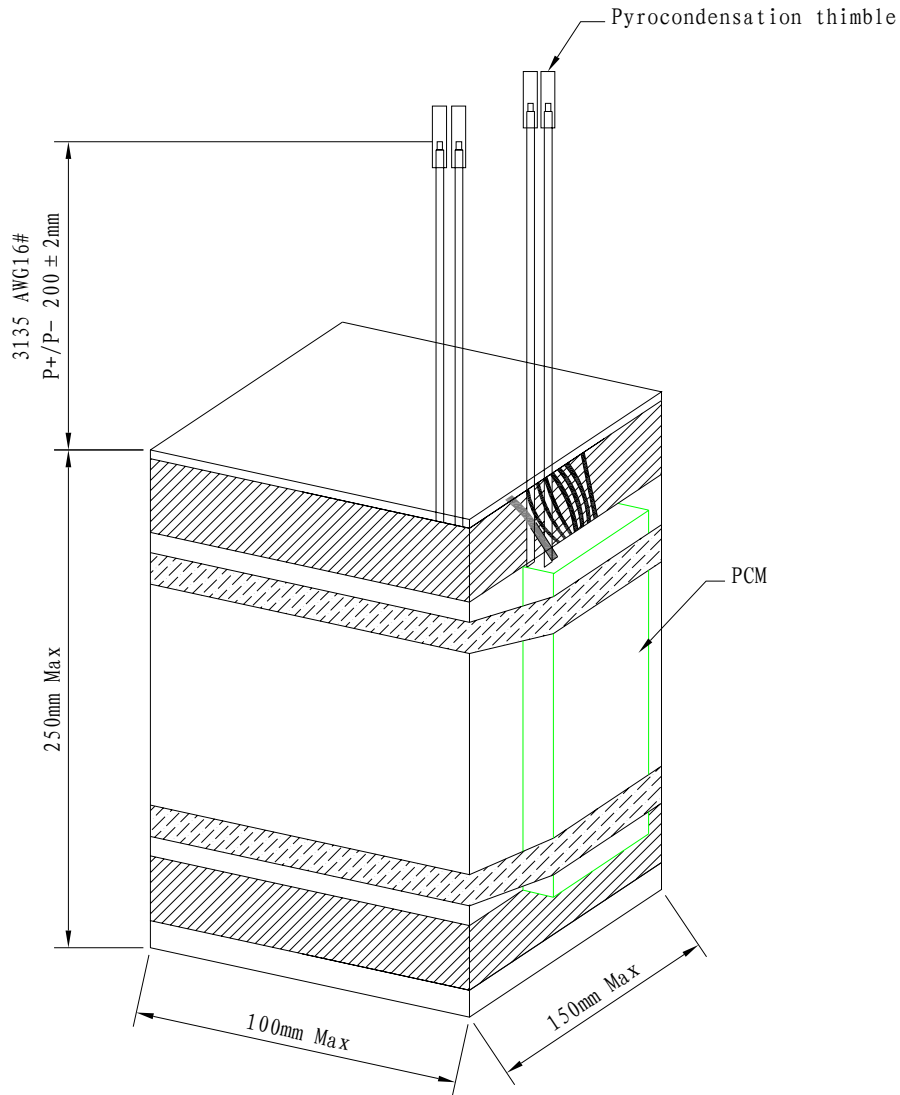
3.4.1.2 Over-discharge: When battery is over discharged than the over-discharge protect voltage, the over-discharge circuit worked, it will cut the circuit to protect the cell when reach to the retard time.

Over-discharge protection	Protect voltage(single cell, connect to load)	2.9V/cell
	Protect retard time	144mS
	Protect unchain condition	charging

3.4.1.3 over-current protection: when the current is over than the over-current, the over-current circuit will work, it will cut the discharge circuit when reach to the retard time.

Over-current protection	Protect current	>125A
	Protect retard time	9mS
	Protect unchain condition	Charging

4. Cell assemble drawing



5. Cell parameter index:

1. Single cell parameter

No.	Item	Spec.	Note
1	Model	10140190/20Ah	
2	Charging voltage	4.20V	
3	Nominal voltage	3.7V	The cell voltage is 3.6V~3.9V when shipping.
4	Rated capacity	≥20Ah @0.2C Discharge	Nominal Capacity refers to the capacity of 0.2C discharge with 2.75V cut-off voltage, after charging by standard method.
5	Cycle Life	≥ 300 Times	One cycle refer to one charge period and then one discharge period. Test condition: Charge current: 0.2C Cut-off voltage: 2.75V The cycle life is the cycle times when the discharge capacity is about 80% of the rated capacity.
6	Self-discharge	Remain capacity> 90%	After standard charging, storied at 5°C±2°C for 30 days, then measure the capacity as Item 4
7	Impedance	≤10mΩ	After Standard charging, measure the internal resistance with AC1KHz
8	Max. Charge Current	1CmA (20Ah)	
9	Max. Discharge Current	1CmA (20Ah)	
10	Discharge Cut-off Voltage	2.75V	
11	Operating Temperature	Discharge : -10°C ~ +60°C Charge : 0°C ~ +45°C	Cells must be storied at 3.6V-3.9V. During long period storage, cells should be maintained every 90 days.
12	Storage Temperature	within 1 month: -5 °C~+45°C within 3 month: -5 °C~+35°C within 6 month: 0 °C~+35°C	Relative humidity 65 ± 20%RH Voltage:3.8±0.1v
13	Cell Weight	Approx 0.5g	
14	Cell Dimension	L : 190mm Max W : 140mm Max T : 10mm Max	Without tabs.

2.Paremeter of battery pair

No.	Item	Spec	Remark
1	Rated capacity	≥20Ah	@0.2CmA Discharge
2	Nominal voltage	25.9V	After standard charging, and then discharge according to standard. The average voltage when discharge is the nominal voltage.
3	PCM	GMBB090709	
4	Assemblage Dimension	L : 250mm Max W : 150mm Max T : 100mm Max	Measured with weighting 300gf at 25°C± 5°C Not including battery drawing line.

*Except the special explain, all the tests of this product in the spec is made according to the following condition:

Temperature: 25°C±5°C Humidity: 65 ± 20%

6. Battery pack Guideline:

Read the guideline carefully, and make sure to use the battery properly. GMB don't take responsibility of the problem for advert the following.

Dangerous!

- Do not throw the cell into fire or heat the cell.
- Do not throw the cell into water or bemoist it, dip in the liquid, such as the seawater, drink, beer.
- Do not use or store the battery in the heat source(such as fire or heater)
- Please use the original charger.
- Do not connect the anode and cathode reversely.
- Do not connect the battery with wall jack or smoke jack.
- Do not short-circuit the battery with wire or other metal objects, don't ship or store with necklace, barrette or other metal objects.
- Do not bump, throw or drop the battery.
- Do not solder the battery terminal directly.
- Do not break up the battery in any way.
- Forbid to charge the battery near the fire source or under hot condition.

Caution !

- Do not put the battery in the micro-wave oven or pressure vessel.
- Do not use the battery with non-rechargeable battery(such as dry battery) or different capacity, model, type battery.
- Do not use the damaged battery.
- There maybe damage during the shipment, if there's any abnormal matter, such as battery's seal is broken or case is broken, smell the electroyte, leakage and so on, this battery can not be used any more.
- Do not use the battery if there is any smell, heating, distortion, color changed or other abnormal situation; you should stop to use if it is in charging; you should beyond fire to avoid fire or explode if there is any leakage or smell.
- Do not wipe but wash the eyes when the electrolyte comes into it, then go to the doctor. The eyes will be harmed if not treat in time.

Notice !

- Don't use the hot battery, such as the shine shining directly or in the car in summer. Otherwise, the battery will hot exceedingly, it may cause fire, and then it will effect battery performance, even decrease the battery life.
- Use the battery on the nominated machine.
- When your children use the battery, please teach them according to the instruction and pay attention to they use it properly.
- If the battery leaked, the electrolyte drop on the skin or clothes, please use running water to clean it immediately, or it may cause chafing.

- Read the battery's setting instruction, install and disassemble the battery properly.
- If the battery terminal is dirty, please wipe it with eraser or dry cloth before using, or it maybe cause the battery disconnection, to lead the capacity consume or can not be charged.

7. Special remind

Please take out the battery and settle it in the cool and dry place if you don't use the battery for long time, or it may cause rustiness or bad performance.

No use for long time, please keep the battery capacity at 50%, it means: not full charged and not full discharge. And re-charge it after 2-3 months(voltage is 25.2~27.3V), and use the 50% of capacity. And then, store the battery in dry place and avoid to sunshine directly. In this way, it can avoid the battery damage for long time.

8. Transport

Battery should be shipment at 35~50% of capacity. It should be avoided that shake, impact or extrusion strongly. Prevent to solarization and drench. It should use autocar, traun, plane and so on.

9. Declaration

Guangzhou Markyn Battery Co.,Ltd has right to modify this spec sheet. After modification, we will inform customer with formally documents.