



Lithium-ion Battery

DATA SHEET

Battery Model:
2LIR18650-PCM-LD

Prepared	Authorized	Approved
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Manufacturer: EEMB Co., Ltd.

Website: <http://www.eemb.com>

This Specification describes the requirements of the lithium ion rechargeable battery pack supplied by EEMB Co., Ltd.

1. Specification

No	Item	Specification		
1.1	Typical Capacity	2200mAh		
1.2	Initial Impedance	$\leq 250\text{m}\Omega$		
1.3	Weigh	Approx.105g		
1.4	Nominal voltage	7.4V		
1.5	Charging voltage	8.4V		
1.6	Dimension	67.0×37.0×19.5mm		
1.7	Lead Wire	UL1007-24# 50(±3)mm		
1.8	Maximum discharge current	4400mA (2.0C ₅ A)		
1.9	Storage Temperature	-20~55℃	$\leq 1\text{month}$	Percentage of recoverable capacity no less than 80% of the initial capacities
		-20~45℃	$\leq 3\text{months}$	
		-5~30℃	$\leq 1\text{year}$	
1.10	Storage Humidity	40%~80% HR		
1.11	Appearance	Without distortion and leakage		
1.12	Standard testing condition	Temperature :25±5℃ Humidity : 40%~80% HR Atmospheric Pressure: 86~106Kpa		

Remark: Operating temperature :charging0~45℃ ;discharging-20~60℃

2. General Performance

	Item	Inspecting Method	Criteria
2.1	0.2C Capacity	At standard testing condition, after standard charging, rest battery at 10min, then discharging at 0.2C to voltage FD, recording the discharging time.	$\geq 300\text{min}$
2.2	1C Capacity	At standard testing condition, after standard charging, rest battery for 10min, then discharging at 1C to voltage FD, recording the discharging capacity.	$\geq 54\text{min}$

2.3	Cycle Life	The capacity measured after 300 cycles of complete charge and discharge at 1C current to 2.75 V cut-off	Capacity more than 80% of Initial capacity
2.4	Complete Charge	The battery is charged with constant current 0.5C mA and constant voltage 8.4V until the charging current is less than 0.01CmA.	
2.5	Initial capacity	The capacity measured after the battery is discharged with constant current 0.2C until the voltage reaches 2.75V cut-off in one hour after complete charge.	$\geq 2100\text{mAh}$

3. Environment Performance

No	Item	Inspecting Method	Criteria
3.1	Discharge at High temperature	At standard testing condition, after standard charging, rest the Cells 4h at $60\pm 2^{\circ}\text{C}$, then discharging at 1C to voltage FD, recording the discharging time.	$\geq 54\text{min}$
3.2	Discharge at Low temperature	At standard testing condition, after standard charging, rest the Cells 16h at $-20\pm 2^{\circ}\text{C}$, then discharging at 0.2C to voltage FD, recording the discharging time.	$\geq 210\text{min}$
3.3	High temperature cycle	At $(50\pm 2)^{\circ}\text{C}$, discharge current 0.5C mA and charge constant voltage 16.8V cycle test three times	No explosion, fire, or smoke. Charge efficiency $\geq 90\%$
3.4	Low temperature cycle	At $(-20\pm 2)^{\circ}\text{C}$, discharge current 0.5C mA and charge constant voltage 12.6V cycle test three times	No explosion, fire, or smoke. Charge efficiency $\geq 85\%$

4.Safe Characteristic

No	Item	The method and Condition	Criteria
4.1	Overcharge testing(NO PCM)	At standard testing condition, charging cell with CC 3C to voltage 4.6V, then with CV4.6V till decline to 0. Stop test till cells temperature 10°C lower than max temperature.	No smoke or fire

4.2	Over discharge testing(NO PCM)	At standard testing condition, the pack be discharge to cut-off voltage, then connect with external load of 30ohm for 24 hours.	No fire ,no smoke ,no leakage
4.3	Short-circuit testing(NO PCM)	At standard testing condition, after standard charging, connect pack anode and cathode by wire which impedance less than 50mΩ, keep 6h.	No smoke or fire
4.4	E.S.D test	To apply 330Ω resistance and stasis Electricity energy of 150PF capacitor. To All terminals (+, -, TH) apply the below for 10 times each, Contact :±8KV ; Air : ±15KV	No malfunction. No damage.
4.5	Vibration test	Subject to 1 hour 10-55Hz 3.5mm amplitude Vibration for any direction at shipment (Complete packing) state. Then test discharge and rated charge at $25 \pm 2^{\circ}\text{C}$.	No explosion. Fire ,or Smoke. No leakage or damage and Battery Condition good.
4.6	Drop test	Drop test battery 1.0m above steel board of more than 10mm thickness. One time drop each for 6 surface,4 ride direction of a battery pack	No leakage or damage and Battery Condition good. No explosion, fire or Smoke. Discharge time Less than 50 minute
4.7	Appearance	Under light lamp 40 W	Shall be free noticeable flaws breaks, age, Discoloration, deformation, uneven, and other Defects which impair the value of the commodity

5. Protection Circuit

5.1. PCM Standard

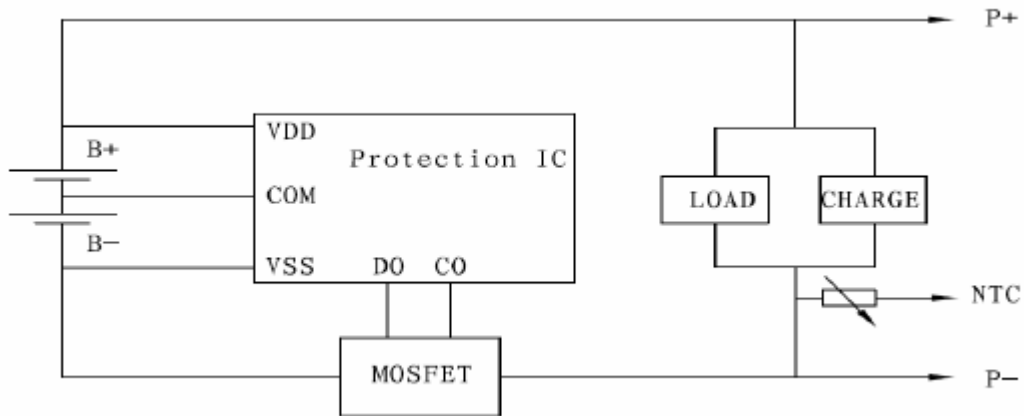
Item	Specification
Over Charge limit	4.25±0.025V

Over Charge release	Remove charger and discharging
Over Discharge limit	2.9±0.1V
Over Discharge release	Charging
Over Discharge Current Protection	2.5±4.5A
Persistent current of Discharge	≤1.5A
Over Charge delay time	1±0.3S
Over Discharge delay time	128±39mS
Over Current delay time	12±4mS
Short circuit delay time	230~500 μ S
Maximum current consumption	<8 μ A

5.2 PCM performance

Item	Specification
Over charge protection	A battery charge with a charging condition of less than 15V/1C and the charging shall be shut off when the internal cell Voltage becomes more than specified protection voltage.
Over discharge protection	When battery discharge with a discharging condition of 1C, The discharging shall be shut off when the internal cell voltage Becomes less than specified protection voltage.
Short protection	After rated charge, (+) and (-) terminals are connected with 10m mental resistor or equivalent by
Current consumption	Ordinary current consumption: consumption current of the protection circuit when internal cell voltage reaches 3.7V(Max:6μA)
General current consumption	Shut off current consumption: consumption current of the Protection circuit when internal cell voltage reaches 2.75v(Max:3μA)

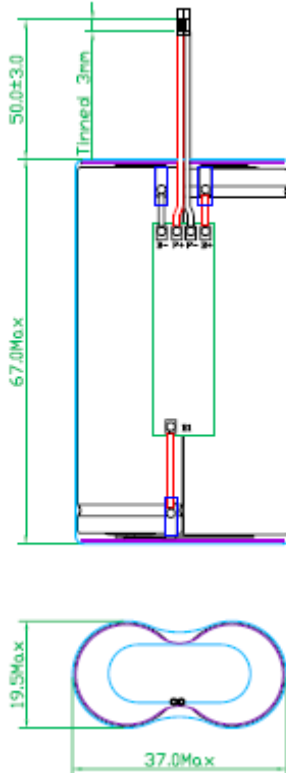
5.3 Schematic diagram



6. Board Connection

Name	I/O	Description
B+	Power	Connect to positive terminal of cell
B-	Power	Connect to negative terminal of cell
P+	Power	DC input power for charging battery or DC output power for discharging battery
P-	Power	DC input power ground

7. Dimensions



8 · Appendix

8.1 Instructions and Safety Requirement

8.2 Recommending Usage

*Please read the battery instructions and the label on its surface before use.

* Use the battery indoors under normal condition, temperature: $(20 \pm 5) ^\circ\text{C}$, absolute humidity: $65 \pm 20\%$.

*When in use, the battery shall be kept out of heat、high voltage and avoided children's touching. Do not drop the battery.

*Use the compatible charger. Do not put the battery into the charger over 24hours.

*Do not touch contacts together. Do not demolish or assembly the battery by yourself. Do not put the battery in the damp place to avoid danger.

*When the battery was stored for a long period, put it well in its half capacity. Do not wrap it with conduct material to avoid the damage caused by the direct contact between the metal and battery. Keep the battery in day places.

*Well disposed the disused battery. Do not put it into fire or water.

8.3 Hazard Warning

* Forbid Disassemble Batteries

The battery has protective component and circuit internally to avoid danger. Mishandling such as improper disassembly will destroy its protective function and make it heat, smoke, distort or burning.

* Forbid Short-circuit Batteries

Do not touch the plus and minus contacts with metals. Do not put the battery with metal element together in either storage or movement. If the battery is short-circuit, it carries magnified current, which will cause damage and make the battery heat, smoke, distort or burning.

* Forbid heat and burn the battery

If heating or burning the battery, it will caused the isolated element in the battery dissolved, protection function stopped or the electrode burning, over heated, which will make the battery heat, smoke, distort or burning.

* To avoid use the battery near the heat

Do not use the battery near the fire and stove, or over 80°C, and over heating will cause the battery internal short-circuit and make it heat, smoke, distort or burning.

* Forbid bathing the battery

Do not dampen the battery, or even immerse it in the water, which will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

* Avoid charging near fire or in the sunlight Otherwise, it will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

* Danger in using non-indicated chargers in

Charging in abnormal condition, the battery will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

* Forbid Damage Battery

Do not allow damage the battery with the metals gouged, forged or dropped etc., otherwise, it will cause over-heated, distort, smoke or burning, even in danger.

* Forbid directly welding on the battery

Over-heated will cause the isolated element dissolved in the battery and losing protective function its cycle life, even will cause over-heat, distort, smoke or burning.

* Forbid directly charging on the power socket or car kit cigarette

High voltage and amplified current will damage the battery and reduce its cycle life, even will cause

over-heated, distort, smoke or burning.

* Do not use this battery for other equipment. Improper usage will damage the battery and reduce its cycle life, even will cause over-heated, distort, smoke or burning.

* Do not touch the leak-out battery. The leak-out electrolyte will cause the skin uncomfortable. If it drops into eyes, do not rub the eyes but wash in time, and go to hospital for treatment.

8.4 Warning

* This battery cannot mix with disposal or twice- recycled batteries in use. Otherwise, for its abnormal charge and discharge, it will cause over-heated, distort, smoke or burning.

* Keep the battery out of children's reach and prevent them biting or swallowing the battery.

* Do not insert the battery onto the charger for a long time if charging beyond the normal time, the battery is still in the charger, please stop charging. The abnormal charging will cause battery over-heated, distort, smoke or burning.

* Do not put into microwave stove or any other pressure apparatus. Take the battery away from the cellular phone or the charger if it is instant heated or leak-out (or odors) and dispose it. The bad battery will cause over-heated, smoke or burning.

8.5 Cautions

* Notice

The battery shall be prevented to be exposed in effluence so as not to cause over-heated, distort, smoke and weaken its performance and cycle life.

* Electro Static-free

There is a protective circuit inside the battery to prevent contingency. Do not use the battery in the Electro static circumstances, for it is easily destroyed the circuit board so that the battery does not work and causes over-heated, distort, smoke or burning.

* Discharging Temperature Range

Recommended discharging temperature range is 0-40°C, beyond which it will result in decadence of the battery performance and shortness of its life.

Read carefully the manual before use or whenever in need.

* Charging Method

Use the special chargers in the recommended charging method to charge the battery.

* First Usage

When you use the battery for its first time, do not put it into the cellular phone or any other equipment once you find it in unusual conditions such as unclearness or odors. The battery should be returned to the vendor.

*** Children Use**

When Children use the battery, they should be under their parents' instructions and superintend in use.

*** Avoid Children's Touch**

Battery should keep out of the place where children in reach. Prevent children taking the battery out of the charger or the cellular phone to play.

* To avoid the leak-out liquid be exposed to the skin or clothes. If touched, please wash by clean water so as not to cause the skin uncomfortable

Consultations

When you buy the battery, please note how to contact with the vendors, so that you may get in touch with vendors for consultation whenever in need.

*** Guarantee period**

Guarantee is one year since it is out of the factory. Life time:300 cycles. Any damage by incorrect use and not quality problem, even in its guarantee period, free service won't be provided by the manufacture.

*** Safety Usage Guarantee**

If the battery is used on other instruments, please contact with your manufacturer for how to get the best performance, at least consult its maximum current, fast charge and special application.

8.6 Quality Evaluation Programme

Quality evaluation composes of authoritative check and quality consistence check. Authoritative check is carried out on design decision, emended design and production decision. It should be confirmed by both Purchaser and Vendor on sampling proposal, check project, sequence and judgment etc., which in principle should be all included. Quality consistence check should be divided into lot by lot check-up and periodical check-up, as to test the quality steadiness during the products in production (refer to GB2828—1987 standard). The detailed check-ups compose of appearance, internal resistance, rating capacity or 1C5A discharging capacity etc.

8.7 Environment Protection

This product accord with ROHS requirement.

! 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 3 months after receipt of the battery and maintain the voltage 7.4~8.0V. And store the battery in cool and dry place.