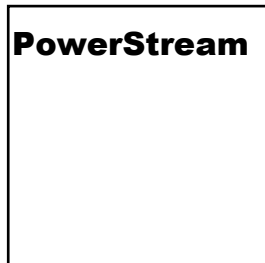


High Capacity Rechargeable Li-Ion Battery Specifications

Model No: IMP278094S

Issued: Technical Service Dept.



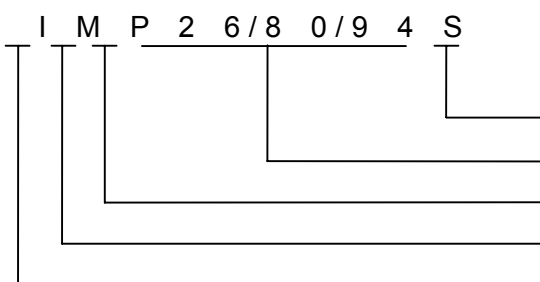
1.0 Scope

This Specification is applied to rechargeable lithium ion battery pack IMP278094, indicating nomination, technical requirement, test method, transportation, storage and cautions etc.

2.0 Standard

- The specification is based on the technical specification of GB/T18287-2000 、UL1642 and CE61960.
- GB/Z 18333.1-2001 Lithium-Ion batteries for electric vehicles
- High power rechargeable Lithium-Ion performance test standard---Lithium-Ion Battery Test (trial edition)

3.0 Nomination and Classification



Case material: S: steel

Single battery size: T×W×H (26×80×90mm)

Shape: P: Prismatic

Positive: M: Mn as the primary positive system

Negative: I: inserted Li negative system

4.0 Nominal Specification

4.1	Model	IMP27/80/94S
4.2	Case material	Stainless steel
4.3	Nominal voltage	3.7 V
4.4	Discharging current	4000mA
4.5	Nominal capacity	12Ah
4.6	Internal Impedance	≤7mΩ
4.7	Discharging voltage (max)	3.0V
4.8	Charging/discharging(std.)	2.4A×7.5h
4.9	Charging/discharging (fast)	6A×3.5h
4.10	Pulse discharging current (max)	36A
4.11	Charging voltage (max)	4.25V
4.12	Charging method	CC/CV (Constant current/constant voltage)
4.13	Outline dimensions	Length: MAX.27.5mm Width: 80.0±0.5mm Height: MAX.105.0mm
4.14	Weight	About 460g

4.15	Environmental temperature	charging: 0~45°C discharging: -20~55°C
4.16	Storage temperature range	1 month -20~55°C 3 month -20~45°C 12month -20~25°C
4.17	Relative humidity	65±20%
4.18	Appearance standard	Deformation, dirty, stain or leakage is not allowed
4.19	Transportation standard	3.90±0.05 V

5.0 Test Standard Conditions

Unless otherwise specified, all tests stated in this Product Specifications shall be conducted under the following atmosphere condition:

Temperature: 15°C – 35°C;

Relative Humidity: 25% – 85%;

Atmospheric Pressure: 86kPa – 106kPa

5.1 Electrical Characteristics

No	Item	Test Method	Requirement
1	Full Charge	The charger supplies 1C5A constant current until battery voltage reaches 4.25V, then be changed at constant voltage of 4.25V while tapering the charge current to less than or equal to 0.01C5A. Charging time is 3.0 hours in all and the charger shows full charged.	Specified charger
2	Nominal Capacity	Within 1 hour after fully charged, discharge at 0.2C5A continuously down to 3.0V, measure discharge capacity	12Ah
3	Cycle life	A battery shall be repeated 400 charge/discharge cycles, discharged at 1/3C5A continuously down to 3.0V Cut-off Voltage, measure discharge capacity.	≥ 80% * capacity
4	Storage performance	After fully charged, stored for 28 days at 20°C, then for 1 hour at normal temperature and continuously discharge at 1/3C5A to 3.0V.	Capacity retention rate ≥ 80%
			Capacity recovery rate ≥ 90%

5.2 Temperature Adaptability

No	Test condition	Test Standard	Performances
1	Temperature	Measure capacity with constant discharge current 0.2C5A to 3.0V cut-off for any single cell at each temperature after complete charge at 20°C.	80% at -20°C 90% at 55°C
2	Vibration	The battery will be vibrated 10 times in three mutually perpendicular directions with amplitude of 0.19-0.38mm and changing frequency between 10 and 55Hz. The rate of scanning frequency is from 10HZ to 55 HZ with the rate of 1HZ per min.	The battery shall not rupture, smoke, catch fire, leak. The voltage is normal

Safety Performance

No	Item	Test Method	Performances
1	Short Circuit	The battery is to be short-circuited by connecting the positive and negative terminals of the battery with an external load of less than 10 mΩ.	The battery shall not rupture, explode, leak, smoke, catch fire.
2	Over charge	The full-charged battery will be charged continuously for 90min with the external power supply of the limit voltage of 10V and the current of 1C5A.	
3	Over discharge	After full charge, the battery will be discharged to end voltage. Then connect with external load of 30Ω for 24hrs.	The battery shall not rupture, explode, leak, smoke, catch fire.
4	Nail Penetrating	Penetrate a charged battery vertically with a 3.0~8.0mm diameter nail.	. The battery shall not rupture, explode, smoke, catch fire.
5	Crush	A charged battery is to be crushed between two flat surfaces. The crushing is to be continued until at 0V voltage.	
6	Heating	Place the battery in an oven. The temperature of the oven is to be raised at a rate of 5°C±2°C/min to a temperature of 100°C±2°C, and remain for 20min	The battery shall not rupture, explode, catch fire.

6.0 Protection Functions

To ensure safety, the battery pack is required to specified charger and protection circuit module as follows;

No	Unit	Item	Requirement
1	Charger	Charge limit voltage	$4.20 \pm 0.03V$
2		Charge limit current	$(0.2 \sim 0.3C)A$
3	Protection Circuit (Reference)	Excess Charge detection voltage (cell)	$4.25 \pm 0.050V$
4		Excess Charge release voltage (cell)	$4.15 \pm 0.05V$
5		Discharge termination voltage (cell).	$3.00 \pm 0.10V$
6		Excess discharge detection voltage (cell)	$2.40 \pm 0.08V$
7		Excess discharge release voltage (cell)	$2.90 \pm 0.10V$
8		Pulse current detection value	$33 \pm 3A$

7.0 Warranty Period of Battery

The warranty period of a battery is for 6 months after shipment. Refer to our warranty terms.

8.0 Package

The following warnings should be shown on the packaged battery

- use specified charger
- do not place near fire or heat
- do not short circuit the battery terminals
- do not disassemble PCM with batteries

9.0 Transportation

The battery should be shipped with half-charged state and in box; during transportation, there shall avoid shock, crush, under sun and shower and shall be shipped by truck, train, ship or airplane etc.

10. Storage Condition

① Storage Temperature and Humidity

- Store the battery at temperature range $-5^{\circ}C \sim +35^{\circ}C$, relative humidity of less than 75% and no corrosive gas atmosphere. Keep far away from fire or heat.
- No condensation on the battery.

② Long Period Storage

- In case of long period storage (more than 3 months), store the battery at temperature range $-5\sim+25^{\circ}\text{C}$ 、 low humidity, no corrosive gas atmosphere. And in this case, charge/discharge condition of one full cycle, and store the battery at 3.8V/cell.

Danger !

1. Disassemble and Reconstruction

“Do not disassemble or reconstruct battery”

The battery pack has safety function and protection circuit to avoid the danger. If they have serous damage, it will cause the generating heat, smoke, rupture or flame.

2. Short-circuit

“Don not short-circuit battery”

Do not connect + and – terminals with metals (such as wire). Do not carry or store the battery with metal objects (such as wire, chain necklace or hairpins). If the battery is short-circuited excessive large current will flow and then the generating heat, smoke, rupture or flame will occur. And also, it causes generating heat at metals.

3. Incineration and Heating

“Do not incinerate or heat the battery”

These occur the melting of insulator, damage of gas release vent or safety function, or ignition on electrolyte. Above mentioned matters cause the generating heat, smoke, rupture or flame.

4. Use nearby Heated Place

“Do not use or leave battery nearby fire, stove or heated place(more than 80°C)”

In case that separator made of polymer is melted by high temperature, the internal short-circuit occurs in individual cells and then it causes the generating heat, smoke, rupture or flame. In addition, do not use the battery under the heated place(more than 80°C).

5. Immersion

“Do not immerse the battery in water or sea water, or get it wet”

If the protection circuit included in the battery is broken, the battery will be charged at extreme current or voltage and the abnormal chemical reaction occurs in it. And then it causes the generating heat, smoke, rupture or flame.

6. Charge nearby Heated Place

“Do Not charge battery nearby the fire or under the blazing sun”

if the protection circuit to avoid the danger works under high temperature or it is broken, the battery will be charged at abnormal current (or voltage) and abnormal chemical reaction will occur. It causes the generating heat, smoke, rupture or flame.

7. Charger and Charge Condition

“Do use the specified charger and observe charging requirement”

If the battery is charged with unspecified condition (under high temperature over the regulated value, excessive high voltage or current over regulated value, or remodeled charger), there are cases that it will be overcharged or the abnormal chemical reaction will occur in cells. It causes the generating heat, smoke, rupture or flame.

8. Penetration

“Don to drive a nail into the battery, stick it by hammer, or tread it”

As the battery might be broken or deformed and then it will be short-circuited, it causes the generating heat, smoke, rupture or flame.

9. Impact

“Do Not give battery impact or throw it”

The impact might cause leakage, heat, smoke, rupture, and/or fire of cell in the battery. And also if the protection circuit in the battery is broken, the battery will be charged abnormal voltage or current, and abnormal chemical reaction might occur. It might cause leakage, heat, smoke, rupture, and/or fire.

10. Deformation

“Do not use the battery with conspicuous damage or deformation”

It causes the generating heat, smoke, rupture or flame.

11. Soldering

“Do not make the direct soldering on battery”

As the insulator is melted by heat or the gas release vent (or safety function) is broken, it causes the generating heat, smoke, rupture or flame.

12. Reverse Charge and Over-discharge

“Do not reverse polarity (and terminals)”

On charging, the battery is reverse-charged and abnormal chemical reaction occurs. And also, there may be case that unexpected large current flows on discharging. These cause the generating heat, smoke, rupture or flame.

13. Reversed Polarity Use

“Do not reverse-charge or reverse-connect”

The battery has polarity. In case the battery is not connected with charger or equipment smoothly, do not force them and do check polarity of battery. If the battery is connected to opposite polarity with charger, it will be reverse-charged and abnormal chemical reaction will occur. It causes the generating heat, smoke, rupture or flame.

14. Inappropriate Use For Other Equipment

“Do not use battery for other equipment”

If the battery is used for unspecified equipment, it will deteriorate its performance and cycle-life. At worst, abnormal current will flow or battery may generate heat, smoke, rupture or flame.

15. Leakage

“Do not touch leaked battery”

Do not touch your eyes but wash them immediately, and then see a doctor if leaked electrotype is into your eyes. If pay no attention to your eyes, it will cause eye disease.

Warning !**1. Mixed Use**

“Do not use Lithium Ion battery in mixture”

Do not use Lithium Ion battery with the primary batteries or secondary batteries whose capacity or kinds or maker is different. If do that, the battery will be discharged or charged excessively in use. And it may cause the generating heat, smoke, ruptured or flame because

of the abnormal chemical reaction in cells.

2. Ingestion

“Keep the battery away from babies”

Keep the little battery out of the reach of babies in order to avoid troubles by Swallowing. In case of swallowing the battery, see a doctor immediately.

3. Charging Time

“Do not continue to charge battery over specified time”

If the battery is not finished charging over regulated time, let it stop charging. There is possibility that the battery might generate heat, smoke, rupture or flame.

4. Storage

“Do not get into a microwave or a high pressure container”

It causes the generating heat, smoke, rupture or flame because of a sudden heat or damage of sealing condition of battery.

5. Leakage

“Do not use a leaked battery nearby fire”

If the liquid leaks from the battery (or the battery gives out bad smell), let the battery leave from flammable objects immediately. Unless do that, the electrolyte leaked from battery will catch fire and it will cause the smoke, flame or rupture of it.

6. Rust, Charging color and Deformation

“Do not use an abnormal battery”

In case the battery has bad smell or is generated its changing color or deformation or causes something wrong in using (includes charging and storage). Let it take out from equipment or charger and do not use it. If an abnormal battery is used, it will generate heat, smoke, rupture or flame.